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The Roles and Responsibilities of WA General Practice Nurses in Diabetes Care and Management

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Declaration

I declare this dissertation is my own work, which has not previously been submitted

for a degree award at any tertiary institute.

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<u>ABSTRACT</u>

The rising incidence of chronic diseases such as diabetes, associated comorbidities, an ageing population and rising health expenditure are all creating a greater burden on the Australian health care system.

Purpose of the Study

The role of the practice nurse (PN) working within the general practice setting is expanding in response to health care demands and government policies, yet there is a lack of Australian research into how this role may impact upon the management of diabetes. This study explores current practice of PNs, their diabetes specific education, and driving and restraining forces that influence their involvement in diabetes management.

Methodology

A cross sectional design with a postal survey, whereby 758 surveys were distributed to PNs via each of the 13 Western Australian Divisions of General practice, between October 2006 and May 2007. The final response rate was 16% (n = 118) with 118 surveys completed and returned. The Statistical Package for Social Sciences 15.0 was used for data entry and analysis.

General Practice Setting

In the current study 85% (n = 94) of practices had a diabetes register, with 75% (n = 83) of PNs involved in operating this system. The PN has a defined role in contributing towards the development of chronic disease care plans and annual diabetes complication screening processes, services that are reimbursed through Medicare. However, current models of primary care delivery and funding appear to

support the PN in this role as an adjunct to the general practitioner (GP), which may not permit full utilisation and recognition of the PNs' professional scope of practice.

The Role of the Practice Nurse

A statistically significant association was found between those PNs having completed diabetes related continuing education and the greater likelihood of providing education in insulin initiation, blood glucose monitoring, dietary advice, exercise and sick day education ($p < .05$). Whilst PNs in the current study displayed a high level of involvement in various areas of diabetes care, not all will be educationally prepared, yet may be undertaking what could be considered a more advanced practice role in diabetes self management education.

Diabetes Knowledge Test

There was significantly higher scoring in the Diabetes Knowledge Test (DKT) where questions related to insulin therapy, amongst those PN's with a role in providing education in self monitoring of diabetes ($p = .036$). Likewise, where the provision of dietary advice was part of the PN role, scoring was significantly higher in the DKT overall ($p = .029$). For those spending greater than two hours per week in diabetes related care, scores were significantly higher where questions examined principles surrounding management of blood glucose levels ($p = .031$). Practice nurses having undertaken a clinical audit related to diabetes care, scored significantly higher in the DKT overall ($p = .037$), particularly where those questions related to the complications associated with diabetes ($p = .009$).

Barriers and Facilitators to PN Role in Diabetes Self Management Education

Practice nurses in the current study placed a significantly high level of importance on their role in patient teaching. However, time was found to be a significant barrier to this role ($p < .05$). The current study displays a high level of involvement by PNs in

various areas of diabetes self management education and related clinical assessment, with a low level of involvement in diabetes specific continuing formal education. Whilst this facet of their role has more recently been acknowledged within general practice guidelines for diabetes management, the question remains as to the level of educational preparedness of the PN, to meet this expanding role.

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CHAPTER 1

INTRODUCTION

Diabetes is the fourth leading cause of death by disease, accounting for 3.8 million deaths per year globally (International Diabetes Federation [IDF], 2009). It is estimated that at least 50% of all people with diabetes worldwide are unaware of their condition; in some countries this figure may be as high as 80% (IDF, 2009). In Australia, diabetes is a national health priority, with more than one million Australians estimated to have this chronic disease (Phillips & Aloizos, 2005).

Diabetes is a major risk factor for cardiovascular disease, which is the main cause of death in people with diabetes; this includes heart attack, stroke and peripheral vascular disease (IDF, 2009). Such comorbidities associated with diabetes create a greater economic burden on the health care system at all levels of care. An Australian Institute of Health and Welfare (AIHW) report on the costs of diabetes in Australia showed that in 2004-2005 the direct health care expenditure on diabetes was estimated to be $907 million (Pieris-Caldwell, Templeton, Ryan, & Moon, 2008).

Whilst the prevalence of diabetes has been highest in developed countries and mostly amongst elderly populations, prevalence rates are escalating amongst younger populations and within developing countries undergoing urbanisation, in line with changing diet, increasing levels of obesity and the adoption of sedentary lifestyles (IDF, 2009). However up to 80% of type 2 diabetes is preventable by adopting a

healthy diet and increasing physical activity. With the increasing demand for health care, Armstrong (2005) highlights the growing support for a shift in the way healthcare is delivered in Australia, towards a much greater emphasis on primary health promotion and illness prevention. The primary health care setting of general practice plays a vital role in the organisation and delivery of multidisciplinary care for persons living with chronic diseases like diabetes.

General practice is an integral part of the Australian primary health care system, providing health care for individuals, families and the wider community (Watts et al., 2004). General Practitioners (GPs) operate predominantly through private medical centres and are described as the individual's first port of call for assistance with health in the Australian health care system (Britt et al., 2008). There are a growing number of nurses employed to work in general practice centres. Known as practice nurses, they are important members of the primary health care team. Sometimes also referred to as the general practice nurse; in this thesis they will be referred to as the practice nurse (PN). The PN, working in the general practice setting, has the opportunity to significantly contribute towards the delivery of primary care, in particular chronic disease care (Watts et al., 2004). With chronic diseases increasingly being managed in general practice, what is not well known is whether the PN is adequately prepared and equipped to meet the needs of an expanding or advanced role in this area; hence the present study investigates the roles, responsibilities and educational preparedness of the PN in the management of diabetes.

This chapter outlines the major types of diabetes, related pathophysiology and the impact diabetes has on the body. In addition to this, the manner in which diabetes care is delivered within Australian general practice will be introduced.

DIABETES

Diabetes Mellitus is defined as a metabolic disorder where the body's capacity to utilise glucose, fat and protein is disturbed due to insulin deficiency and/or insulin resistance (Dunning , 2003). Insulin is necessary for the body to be able to utilise glucose and thus a relative, or absolute deficiency in insulin levels, leads to elevated blood glucose levels, known as hyperglycaemia, which is the distinguishing feature of diabetes. There are three main types of diabetes type 1, type 2 and gestational diabetes mellitus. Each type has different causal mechanisms and symptomatology; consequently the management principles, whilst generic, may be specifically focused.

Type 1 Diabetes

The development of type 1 diabetes results from a complex interplay of genetic, environmental and immunologic factors, with an end result of autoimmune destruction of the insulin producing pancreatic beta cells (Braunwald et al., 2001). This whole process may take several years and the end result of the beta cell destruction is an absolute insulin deficiency, requiring daily insulin therapy to survive. Type 1 diabetes accounts for around 10-15 % of all people with diabetes (International Diabetes Institute [IDI], 2006).

While type 1 diabetes typically affects children and young adults, it can occur at any age. There is a clear association of type 1 diabetes with certain predisposing genotypes, however, individuals will largely present without a family history of the disease. This is contrary to type 2 diabetes which commonly shows a strong familial pattern. Whilst the cause of type 1 diabetes is still being researched, it is thought that a virus or other toxin may trigger this reaction in people who are genetically predisposed (IDI, 2006). The autoimmune destruction of the beta cells eventually produces an acute symptomatic response; therefore symptoms will likely present within weeks to months. Without insulin, glucose builds up in the blood stream and the body uses fat as an alternative energy source, which results in ketone production. Thus patients typically present with elevated blood and urinary glucose levels and a history of unexplained weight loss. In more severe cases, the patient may present with diabetic ketoacidosis (DKA), which can be a life threatening complication of diabetes and is characterised by hyperglycaemia, ketonuria, metabolic acidosis and dehydration (Dunning, 2003).

Type 2 Diabetes

Braunwald et al. (2001) define type 2 diabetes as a heterogeneous group of disorders characterised by variable degrees of insulin resistance, impaired insulin secretion and increased glucose production. A combination of genetic and metabolic defects as well as environmental influences such as poor diet and increasingly sedentary living, leads to the characteristic high blood glucose levels in type 2 diabetes. This is the most

common form of diabetes in Australia, accounting for more than 85% of persons with diabetes. Unfortunately, its development can go undetected as some functional insulin is still produced and symptoms may not become evident until blood glucose levels are very high. It is often diagnosed late when complications, such as cardiovascular disease, neuropathy or retinopathy, may already be present (Dunning, 2003). Of particular concern is the emergence of evidence showing that type 2 diabetes, previously a disease of middle to older aged people, is now being reported in adolescents and children worldwide (Alberti et al., 2007).

Symptoms of type 2 diabetes that may occur include thirst, tiredness, frequent urination, blurred vision and sometimes weight loss. The reduction or modification of known risk factors, such as excess weight, physical inactivity and poor diet is widely recognised as appropriate in the prevention and or management of type 2 diabetes. The aim of treatment is to control blood glucose levels and prevent health problems associated with diabetes (IDI, 2006). If blood glucose levels are not well controlled with dietary and physical activity measures, medication will likely be necessary to lower blood glucose levels (IDI). Furthermore, type 2 diabetes is a progressive disease and insulin production may decrease over time to the point where insulin therapy is needed to adequately control blood glucose levels (IDI).

Gestational Diabetes

Gestational Diabetes Mellitus is a form of diabetes that develops during pregnancy in women who have not previously been diagnosed with diabetes. It occurs in approximately 1 in 20 pregnant women (IDI, 2006), causing a glucose intolerance that usually subsides upon delivery of the baby. However, women with a history of gestational diabetes are at an increased risk of developing type 2 diabetes later in life (IDI). The causal factors include insulin resistance and hyperglycaemia which develop due to the effects of placental hormones (Dunning, 2003). Learning to keep blood glucose levels within the normal range during pregnancy is vital to reducing the associated risks, with between 10 - 25% of all women with gestational diabetes requiring insulin injections as part of their treatment (Australasian Diabetes in Pregnancy Society, 2008).

DIABETES PREVALENCE

While the prevalence of type 1 and type 2 diabetes is known to be increasing worldwide, the incidence of type 2 diabetes is expected to rise more rapidly as a result of increasing obesity and reduced activity levels across all ages (Braunwald et al., 2001). Recent data from the International Diabetes Federation [IDF] (2009) indicates that the estimated diabetes prevalence for 2010 is 285 million people, representing 6.4% of the world's adult population, with around 80% of these cases evident in developing countries. The IDF associate this epidemic with the economic advancement of low and middle-income countries and subsequent alteration to the

living environment, resulting in radical changes to diet and physical activity patterns within a generation or two. In Australia, prevalence was determined in the landmark Australian Diabetes, Obesity and Lifestyle study (AusDiab). The AusDiab was a national longitudinal study conducted in 1999-2000 as a component of the National Diabetes Strategy and aimed at investigating the prevalence of diabetes and related disorders. It was the first national study to provide estimates of the number of adult people with diabetes, which at that time was shown to be 7.5% (Dunstan et al., 2001). Diabetes was found to have an increasing prevalence in the older age groups, with figures suggesting an increase from 2.5% in people 35 to 44 years to 23.6% in those 75 years and over (Dunstan et al., 2001). Given Australia's ageing population an increasing demand on health care services, including the general practice setting, is anticipated.

An AusDiab follow up study was conducted in 2004-05, providing insight into predictors and risk factors for diabetes, together with related comorbidities. Findings from this study showed that more than 100,000 Australian adults develop diabetes annually, contributing significantly to the overall burden of disease in Australia (Barr et al., 2006). Between 1989-1990 and 2004-2005, the proportion of people with diagnosed diabetes more than doubled from 1.3% to 3.3% (AIHW, 2008).

Indigenous Australians are severely affected by diabetes. In 2004-2005, it was estimated that the prevalence of diabetes amongst Indigenous Australians was over three times the rate of non Indigenous Australians (AIHW, 2008). This poses a major challenge for the general practice team and other primary health care providers in view of the higher burden of disease, together with the specific cultural and lifestyle

issues related to preventing and treating diabetes within the Aboriginal and Torres Strait Islander population (Royal Australian College of General Practitioners, 2008/2009).

THE IMPACT OF DIABETES

In 2003, diabetes was responsible for 5.5% of the total burden of disease within Australia (AIHW, 2008). In 2005, diabetes was a contributing factor in 6% of all deaths, with nearly 3% of deaths directly due to diabetes (AIHW, 2008). In 2004-2005, people with diabetes had twice the risk of heart attack and were nearly three times as likely to have had a stroke compared with the general population, with their risk increasing further in the presence of smoking, obesity, high blood cholesterol and high blood pressure (AIHW, 2008). Further to this, eye diseases including the microvascular complication of diabetic retinopathy, together with cataracts and glaucoma are more prevalent in people with diabetes. Other microvascular complications such as diabetic nephropathy result from high blood glucose levels which damage the blood filtering capillaries in the kidneys. The 1999-2000 Ausdiab study indicated that approximately 6.3% of Australians aged 45 or over, with diabetes, had experienced kidney disease to some degree (AIHW, 2008). Peripheral neuropathy and peripheral vascular disease, resulting from nerve damage and poor circulation respectively, are further complications of diabetes which can lead to lower extremity amputations and associated morbidity and mortality.

O'Brien, Thow and Ofei (2006) reporting on diabetes hospitalisations in Australia, highlighted that in the period 2003-2004 hospital admissions relating to a diagnosis of diabetes was recorded in 7% of all admissions. Between 2000-2001 and 2004-2005, the rates of hospitalisation due to diabetes increased by 35% (AIHW, 2008). In 2004-2005 hospitalisations due to diabetes amongst the Indigenous Australian population was nearly eleven times as high as for other Australians (AIHW, 2008). Worse still, amongst the Indigenous Australian population, hospitalisation due to kidney complications was twenty nine times as high as for other Australians (AIHW, 2008). Further to this, the average length of hospital stay for admissions related to diabetes has been shown to be longer than for hospital admissions for other reasons (AIHW, 2008). The hospitalisation rate and extended inpatient stay adds considerably to the burden of diabetes on the health system, as well as the impact on the lifestyle of the person with the disease.

Widespread population increase in lifestyle risk factors is contributing to the growing incidence of certain types of diabetes. It is crucial that long term Government health planning is inclusive of preventative health measures, appropriate health screening and early diagnosis and management, to lessen the impact of this disease on the individual and wider healthcare resources. The primary health sector, incorporating general practice centres, will increasingly have an important role in implementing such strategies.

PRIMARY HEALTH CARE

The concept of primary health care includes the implementation of a broad model of wholistic care delivery with a focus on preventative health care measures, equitable access, and consideration of societal influences in the delivery of care (World Health Organisation, 2008). In WA, the provision of primary health care occurs through general practice centres and other community based health services, therefore the general practice setting provides an important access point for the identification and management of chronic disease states such as diabetes. The GP has an important role in coordinating care, with Australian Government initiatives now supportive of the role of PNs in their ability to contribute to care; increasingly a multidisciplinary team approach will be required to meet future community health care needs (Porritt, 2007b). Multidisciplinary models of care delivery will be explored more in chapter two.

For the person living with diabetes, a commitment to managing their health to the best of their ability is life long. General practice will most likely be the setting where the diagnosis and ongoing management of diabetes will take place to support the individual. The role of the GP and PN in diabetes care involves systematic screening, diagnosis, ongoing monitoring, complication screening and diabetes self management education. Further to this, diabetes self management education is described by Dunning (2003), as the cornerstone of diabetes management, an ongoing process of empowering people to maintain optimum diabetes control. One health professional trained in the specialty of diabetes self management education and care is the diabetes educator.

In Australia, diabetes educators are professional health care providers who specialise in the provision of diabetes self management education (Australian Diabetes Educators Association, 2008). They comprise health professionals from a range of disciplines who have undergone post graduate certificate level study as a minimum and are eligible for credentialled status as a diabetes educator. The American Association of Diabetes Educators (2009) define diabetes self management education as a collaborative process, whereby people with or at risk for diabetes gain the necessary knowledge and skills to self manage the disease. The process is one of an interaction between the person with diabetes, their family or caregiver and the diabetes educator. The goal of diabetes self management education is to assist the person with diabetes to achieve optimal health and quality of lifestyle.

Credentialled diabetes educators have achieved a minimum level of professional practical experience, mentorship and ongoing education in diabetes management and are now recognised through Medicare for service reimbursement. Diabetes educators are integral to the multidisciplinary healthcare team. The implementation of diabetes self management education follows standardised guidelines; however consideration needs to be given to the assessment of individual learning requirements including cultural relevance. This process will be further explored in chapter two.

Within the general practice setting, the PN has been identified as having an important role in coordinating the care of patients with diabetes. Although PNs are involved in the care of patients with diabetes, within Australia the scope of practice of the PN in diabetes self management education and their educational preparedness to undertake this role are largely unknown. Watts et al. (2004) found PNs in the United Kingdom

(UK) work in an extended role in chronic disease education, including asthma and diabetes management. This has occurred since the introduction of the General Practice Contract in 1990 in the UK by the British National Health Service (Watts et al., 2004). The GP contract provides incentives for GPs to expand general primary health services which resulted in an increase in the number of PNs employed to play a role in the delivery of these services. The Australian health care system has, in more recent years, also begun to implement a system of financial and supportive measures for GPs to expand this area of primary health care. There are increasingly more opportunities for the PN to undertake a role in chronic disease management, diabetes being one such important area of need.

With the existence or otherwise of models of care delivery that are inclusive of PNs, the question arises as to the degree of preparedness of PNs to assume a role in diabetes self management education and care. Critical elements to this preparedness is their degree of knowledge and professional experiences as well as the level of professional support available to PNs within their role in diabetes care. Halcomb et al. (2005) support the extension of the Australian PN role and highlight the potential benefits of the strategic planning of this process, as seen from the UK experience. Fundamental to this strategic planning process is an understanding of the current situation with regard to the PNs current level of preparedness and role in diabetes self management education.

STUDY AIM

The aim of this study was to describe the current practice of PNs related to diabetes self management education and care in the general practice setting in Western Australia, together with factors that impact upon this role. Whilst there are studies that have been carried out within Australia that consider the role of the PN, few have looked at their specific role in diabetes.

Moreover, there is an absence of studies that have investigated the barriers and facilitators to PNs involvement in the care of patients with diabetes. With little documented information in this area, this study aims to contribute insight into this important area of primary health care nursing.

The objectives of this study are to:

1. Describe the existing roles, responsibilities and competencies of practice nurses in diabetes self management education.

2. Determine the educational preparedness of practice nurses in diabetes related knowledge and skills.

3. Identify driving and restraining factors that influence the provision of diabetes care by practice nurses.

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IMPLICATIONS OF STUDY

The role of the PN in Australia is evolving, in response to changing health care demands and Government policies influencing primary health care delivery. There is a lack of research into the type and extent of involvement of PNs in diabetes related care. To address this, the current study explores the practice of PNs related to diabetes self management education and care, together with factors that impact upon this role. The information gained will contribute greater insight into the educational needs and organisational requirements, necessary to further facilitate the PN's contribution towards this role.

This thesis is structured around a further four chapters. The next chapter reviews the literature on the role of the PN within Australia and overseas, along with models of care delivery within Australia, contrasted to overseas counterparts. Chapter three outlines the methodology utilised for the current study. Chapter four highlights results from the analysis of the data obtained from this study. Chapter five incorporates a discussion of these results, in light of the literature reviewed, including limitations identified within the current study and recommendations arising from the findings of this study.

CHAPTER 2

LITERATURE REVIEW

To assist people with chronic disease to optimise their health and lifestyle, there has been debate around a shift in focus of health care delivery from the acute care model, towards health promotion, illness prevention and delivery of multidisciplinary primary health care (Armstrong, 2005). The key focus of this literature review is to highlight the ways in which PNs may contribute towards the multidisciplinary care of people living with diabetes. This review considers some of the factors influencing the evolution of the PN role internationally and within Australia. Models of health care delivery will be discussed in the context of primary health. Additionally, the role of the PN overseas and in Australia will be investigated to determine their current position with respect to their ability to competently and confidently participate within this role in primary health care.

THE PRACTICE NURSE IN PRIMARY HEALTH CARE

For an increasing number of general practices the PN can play a key role in the organisation and delivery of primary health services, supporting the GP and broadening access to primary health care (Watts et al., 2004). Internationally, the position of the PN has been established for many years. In the UK, PNs are now considered integral to the delivery of primary care, influenced by government financial incentives for general practice (Halcomb et al., 2005). In England the National Health Service (NHS) implemented the General Practitioner (GP) Contract in 1990, providing a financial incentive for GPs to provide chronic disease clinics.

General Practitioners were required to meet preventative health targets and PNs were employed to help provide these services (Sibbald, Laurent, & Reeves, 2006). In 2004, the GP Contract allowed for expansion of the role of PNs in chronic disease management specifically for diabetes, asthma and heart disease (Sibbald et al., 2006). Similarly, in more recent times Australian Government initiatives have been implemented that support the funding of some PN services through Medicare. Despite the funding changes, the Australian experience is less advanced than the UK.

In 1998 The Australian Divisions of General Practice (ADGP) was established and currently represents approximately 95% of GPs, across 119 divisions of general practice within Australia (Porritt, 2007a). In Western Australia there are thirteen Divisions of General Practice. The WA General Practice Network was established in 2005 for the purpose of supporting the work of GPs and PNs; facilitating communication between the divisions and wider health sector and acting as a voice for primary health care in WA (Western Australian General Practice Network, 2007).

The 2007 National Practice Nurse Workforce Survey estimated there were approximately 895 PNs in WA, with almost 72% of WA general practices employing a nurse (Porritt, 2007a). Moreover, data from the ADGP indicates a trend towards the employment of a greater number of PNs in the general practice setting (Porritt, 2007a). Surveys of Australian general practices undertaken in 2005 and more recently in 2007, showed a 64% growth in the number of PNs employed in general practice over the two years (Porritt, 2007a). Currently, PNs employed in WA comprise 79% registered nurses and 15% enrolled nurses. Growth in the number of

nurses working in general practice has occurred in line with an increasing level of support by the Australian Government and gradual acceptance by GPs of the benefits of the emergent role of the PN in the primary health care setting of general practice. Support for the PN role that is occurring through financial incentives will be discussed next.

PRIMARY HEALTH CARE FUNDING

In Australia, general practice income is primarily generated from fee-for-service activity by GPs (Pearce et al., 2007). Medicare is the national health insurance scheme that enables access to affordable medical services for Australians, including visits to the GP (Gardner & Barraclough, 2002). Within general practice, designated Medicare Benefits Schedule (MBS) item numbers allow GP services to be claimable through Medicare. In recognition of the contribution of PN services, MBS item numbers have been introduced for specific health care services provided by the PN. Initially, in an effort to address workforce shortages in primary healthcare, the federal government in 2001-2002 introduced a practice nurse incentive payment under the Practice Incentive Program, to fund practices in rural and high need areas to employ PNs (Porritt, 2007b). Following on from this, a limited number of MBS item numbers have been established, allowing the PN to deliver specific health care services on behalf of the GP whilst generating income for the practice. These services now include wound care and immunisations (2004), cervical screening (2005) and more recently, antenatal checks (2006) in regional and rural areas only (Porritt, 2007b). However, results of the 1998-99 to 2007-08 "Bettering Evaluation And Care of Health" (BEACH) report, indicated that PNs are providing a

considerable amount of health care that is not claimable through Medicare (Britt et al., 2008)

One area of increasing health service need is chronic disease management of which diabetes is one such example. This is because diabetes is a progressive disease, with an ongoing need for dietary and lifestyle modification and review of individuals' therapeutic regime. As a result of the recognised impact of diabetes on the individual and broader health care systems, the Diabetes Care Incentive was commenced in November 2001 through Medicare. This initiative requires practices to create a patient register and recall system and provides additional incentives for completing an annual cycle of care. These strategies aim to promote best practice through primary prevention and screening for complications of diabetes. A financial incentive through Medicare is then generated each time a patient's diabetes annual cycle of care is completed. There is now a recognised role for the PN to review patients, assisting the GP to meet the requirements for the diabetes annual cycle of care, which will be discussed further in this chapter.

In acknowledgment of the often complex nature and broader implications of chronic diseases, the Australian Government has increased funding to support people in their ability to access multidisciplinary health services, through a chronic disease management plan established by their GP. There are two parts to the chronic disease management plans: The GP Management Plan (GPMP) and the Team Care Arrangements (TCA). The GPMP involves the GP and the patient, incorporating clinical assessment, setting of agreed management goals, action's to be taken and identifying a timeframe for regular review of these goals. For patients who require

additional input from other health providers; the TCA plan supports multidisciplinary team care, in which the PN can play an important role in facilitating this process. This allows financial reimbursement through Medicare, for up to 5 visits per annum to an allied health provider, and people with type 2 diabetes can also access rebates for allied health group education services. Specific allied health providers include credentialled diabetes educators, dietitians, podiatrists, physiotherapists, exercise physiologists and psychologists.

Specifications for chronic disease management plans, including patient eligibility, have evolved over recent years. A clear role for the PN in the set up and facilitation of services relevant to the individuals chronic disease management plan, has also increasingly been established over time. In this capacity, the PN may be involved in diabetes self management education, review of medication compliance, facilitating complication screening and updating patient information to support the ongoing review of the care plan by the GP. These services are to be carried out on behalf of and under supervision (not necessarily directly) of the GP (Royal Australian College of General Practitioners, 2008/2009).

MODELS OF PRIMARY CARE DELIVERY

A coordinated health delivery service within primary care is considered instrumental in helping individuals to optimise health outcomes (Williams, 2000). The previously discussed strategies demonstrate support, through Australian Government funding, for better management of chronic disease in the primary care setting and promote the expansion of the PN role into distinct areas of primary health care delivery.

However, some barriers exist to the implementation of these more specialised roles for PNs working within models of primary care delivery in Australia. This will be discussed below.

The Provider Substitution Model

Hastings (as cited in Watts et al., 2004, p.55) suggests the Provider Substitution Model identifies the GP as the primary provider who delegates to other members of the practice team. In this model, the PN provides services within a variable scope of practice, under the direct or indirect supervision of the GP. Concerns have been raised, in light of the current funding model for general practice, where MBS item numbers provide financial reimbursement to general practice for what could be considered a nursing task, as limiting in terms of fully utilising the diverse knowledge and skills of the PN (Mills & Fitzgerald, n.d.; Porritt, 2007b). As a consequence the President of the Australian Practice Nurses Association (APNA) stated, in relation to the implementation of Medicare reimbursements for specific nursing services in general practice, "that it encourages the practice to become very task oriented" (Armstrong, 2005, p.18). Whilst the GP remains the overall team leader there is clearly greater scope for the PN, when appropriately skilled, to contribute in a unique way within primary care and in particular in chronic disease management. However, Watts et al. (2004) have suggested that the Provider Substitution Model is most reflective of the functioning of nursing and medicine in the Australian general practice environment.

The Collaborative Practice Model

In contrast, the Collaborative Practice Model is a framework for multidisciplinary team functioning (Watts et al., 2004). In this model, PNs along with other allied health professionals have their own unique role and scope of practice complementary to medical intervention, with the GP acting as overall team leader. Aschner, LaSalle and McGill (2007) highlight benefits from the input of a multidisciplinary team in the management of type 2 diabetes, showing improvement in clinical health parameters and quality of life. The authors found this approach resulted in the provision of continuous and accessible care that focuses on the needs of the individual. Further to this, Aschner et al. (2007) recommend the need for careful selection of team members, clarification of roles, focusing on the patient as central to the team, promotion of informed choices and setting of achievable goals by the patient. The concept of multidisciplinary teams is not new. In 1991 Brooking (as cited in Muncey & Parker, 2002, p.6) highlighted the benefit of multidisciplinary teams to support collaboration in research, education, and professional training.

In exploring the emerging role of the PN in cardiovascular disease management, Halcomb, Davidson, Yallop, Griffiths, and Daly (2007) similarly concluded that a shift in primary care delivery is necessary, towards a model of care that supports interdisciplinary practice in chronic disease management. Despite the recognition accorded to the involvement of PNs in chronic disease care, their level of autonomy and scope of practice should be determined by their degree of educational preparedness and experience, prior to the uptake of new or extended roles (Aubert et al., 1998; Khunti, Ganguli, & Lowy, 2001; Kirby, 2005). Watts et al. (2004) have

suggested that these two models of primary care delivery can be viewed at opposite ends of a continuum, from constraint to encouragement, of the PNs' level of autonomy and degree of involvement within the multidisciplinary team. It is the latter approach that is more congruent with the preferred model for primary health care delivery, which is discussed next.

The Chronic Care Model

Where historically care has been organised around responding to acute illness or injury, the ever increasing need for chronic disease management warrants a review of the systems of health care delivery in Australia (Wagner et al., 2001). The focus of care for people living with a chronic condition is to assist self management in the community, rather than the hospital setting and this shift in focus places a high demand on clinician time in general practice. In the knowledge that there is an increasing worldwide burden of chronic disease, a long term view must be taken when considering future policy and models of care planning in Australian healthcare.

In response to the burgeoning need for better care for those with chronic disease, the chronic care model was conceptualised. The aim of the model was to optimise chronic disease management in primary care, utilising a multidisciplinary team approach. The model was developed in Washington and based upon a review of the available literature to identify evidence based best practice (Bodenheimer, Wagner, & Grumbach, 2002).

Bodenheimer et al. define the chronic care model as "a guide to higher quality chronic illness management within primary care" (2002, p. 1775). The model differs from more traditional approaches of health care through its emphasis on self management education and counselling (Siminerio, Zgibor, & Solano, 2004). Moreover, changes generated through this model in terms of a systematic approach to care and regular self management support are showing improved health outcomes around the world (Piatt et al., 2006).

Conversely, a lack of organisation was seen to be a key obstacle in the provision of systematic diabetes care amongst 19 general practices surveyed in New South Wales (Tolhurst et al., 2004). Bernhard and Walsh (1995) have suggested an organisation should be viewed as an open system where all parts making up the system are essential to each other, with communication highly important at all levels. The providers within the primary care team may need to widen their understanding of how to lead and manage change within their own organisation. In particular, Wagner et al. (2001) highlighted evidence that supports the role of experienced clinicians, such as chronic disease nurses, to monitor self management and tailor therapy with the use of protocols.

The multifaceted framework of the chronic care model encourages patient access to diabetes self management education through the combined efforts of health care teams (Horton, Cefalu, Haines, & Siminerio, 2008). Bodenheimer et al. (2002) summarise this model into six interrelated elements that suggest the methods considered necessary for altering practice.

These six elements are discussed below, with reference to the Australian primary health care context:

1. Community resources and policies:

This involves the establishment of a link between the provider organisation, such as general practice and wider community resources, which the patient is encouraged to access. Examples of these resources are allied health services, self management education group classes for people with diabetes, community exercise programs and community support groups.

2. The health care organisation:

Implementation of strategies to improve chronic illness outcomes need to be represented in the organisations' goals and business plans; with consideration given to the provision of incentives supporting the delivery of high quality chronic care. In terms of diabetes care, strategies already encouraged in Australian general practice include the diabetes annual cycle of care, patient register and recall/reminder systems. Further initiatives may include the establishment of diabetes clinics in the general practice setting and expansion of the PN role within a multidisciplinary team; supported through Government financial reimbursement for time spent in best practice diabetes care.

3. Self management support:

Through this collaborative process patients and their families become skilled and empowered to manage chronic illness. Self management skills should be routinely assessed and supported. Diabetes self management education is an example whereby empowerment may come through teaching and encouraging problem solving and goal setting. Education includes dietary changes, self monitoring of blood glucose, benefits of exercise and managing individuals' therapeutic regime.

4. Delivery system design:

Members of the practice team need to have an understanding of individual roles within the interdisciplinary team. The recommendation is for patient visits to be pre planned, for example within a regular diabetes clinic. It is suggested that the GP, as case manager may predominantly treat patients with acute conditions and the more complex chronic cases. The role of the PN will vary dependent on their level of educational preparedness in terms of diabetes care. Their role may include routine assessments, complication screening and diabetes self management education.

5. Decision support:

Evidence based clinical practice should be integrated into daily practice, supported through the input of specialist expertise and the availability of guidelines. In the Australian context, the annual Diabetes Management in General Practice handbook, guides GPs and PNs in the management of diabetes. This guidance includes the

diabetes annual cycle of care, a minimum level of care for all people with diabetes involving review of self management, complication screening and therapeutic guidelines (Royal Australian College of General Practitioners, 2008/2009).

6. Clinical information systems:

Computerised information assists the primary health team to fulfil practice guidelines in three ways. They act as a reminder for scheduled assessments, enable storage of pathology results and clinical indicators to record progress over time and act as a tool for accessing population data.

The six elements of the Chronic Care Model incorporate objectives for designing the way chronic disease care is delivered. In terms of the current Australian context, studies have identified that the expansion of the PN role in chronic disease management has met with barriers that lie at a health system level, including Medicare funding and reimbursement for services as well as legal issues (Halcomb, Davidson, Griffiths, & Daly, 2008).

Using the example of cardiovascular disease management, Halcomb, Davidson, Yallop, Griffiths, and Daly (2007) recommend the need to address current barriers to the development of the Australian PN role, and then following this, research that measures outcomes and efficacy of the PN role within the model of care. Whilst Halcomb et al. (2007) advocate a multidisciplinary model for cardiovascular disease management they suggest it can be applied to other chronic diseases. The authors highlight the merit in developing a model involving the PN that can be measured in

terms of cost effectiveness, clinical outcomes and acceptability to health professionals and consumers. In Australia, broad guidelines for diabetes self management education and complication screening are promoted through the annual Australian Diabetes Management in General Practice handbook, devised by The Royal Australian College of General Practitioners and Diabetes Australia. Whilst the recent edition of this handbook now incorporates a role for PNs, the focus is more on the role of the generalist nurse acting under the guidance of the GP. Conversely, a role for PNs with advanced practice skills within the area of diabetes self management education, who may be appropriately skilled to work more autonomously in this area, is not currently recognised in the present system of Australian primary health care delivery for reimbursement through Medicare.

The need exists for future planning that ensures a model of health care delivery is in place to meet the growing demand for chronic disease care in Australia. Evidence indicates that the Chronic Care Model offers a framework for effective multidisciplinary diabetes care that can be implemented in various practice settings. The next section will explore further the changing role of the PN in diabetes care and consider barriers to the development of this role.

THE CHANGING ROLE OF THE PRACTICE NURSE

The worldwide increase of predominantly lifestyle related diseases, including heart disease and diabetes, associated with obesity and a progressively more sedentary lifestyle will continue to increase the burden and complexity of health care management. Rising consumer health needs, together with changes in health policy

and funding are prompting an expansion of the role of the Australian PN in primary care (Halcomb et al., 2005). However, in terms of diabetes management, the degree to which PNs have appropriate up to date knowledge and skills in order to reliably contribute to care is not widely shown within the literature.

The nature of general practice requires the PN to provide a diverse range of health care services, informed by a broad knowledge base. The responsibilities of the PN role in chronic disease care, in particular for diabetes, would be expected to increase in line with the increasing prevalence of this disease. For the generalist PN, the Diabetes Management in General Practice handbook details quarterly and annual nursing review of health care issues for people with diabetes, to assist the GP to meet the annual cycle of care for patients (Royal Australian College of General Practitioners, 2008/09). Included in these guidelines are recommendations for timely referral to specialist and allied health professionals for further diabetes assessment and education.

In view of this, it is anticipated that the role of the PN will increasingly be expanding into this area. Therefore it would be expected that Australian PNs' require up to date knowledge and skills in diabetes care principles to undertake this role. The management of diabetes in general practice is guided by the requirements for the diabetes annual cycle of care, which include periodic clinical assessment, education and counselling to support lifestyle modification, health promotion and the reduction of risk factors. Much of the evidence for best practice care comes from the results of two long-term landmark diabetes studies, the Diabetes Control and Complication Trial (DCCT) and United Kingdom Prospective Diabetes Study (UKPDS). These

clinical studies showed that the lowering of blood glucose levels to close to normal limits through more intensive management, in type 1 and type 2 diabetes, significantly reduced the risk of developing complications of diabetes (Genuth et al., 2002).

Within the general practice setting, assessment and coordination of care will largely be organised through the GP. The degree of involvement of individual PNs in diabetes care should be determined according to their knowledge and confidence to perform this role. Practice nurses can assess the need for, and refer their patients for more specialised diabetes self management education if the complexity of care warrants this or goes beyond their own scope of practice.

As part of the annual cycle of care, the quarterly PN review of patients with diabetes includes the following areas of health education and assessment; nutrition and exercise, medication compliance, risk reduction such as smoking cessation and reducing alcohol consumption, as well as assessing weight, blood pressure and foot care (Royal Australian College of General Practitioners, 2008/2009). The annual PN review involves a more extensive assessment role including; weight, blood pressure, visual acuity, foot examination, urinalysis, immunisation update, nutrition, risk reduction and revision of health goals. The annual review also provides an opportunity to assess the need for specialist and allied health review. Examples of referrals include diabetes educator, podiatrist, dietitian, exercise physiologist, ophthalmologist or endocrinologist. This role in diabetes assessment, education and referral is also applicable where the PN is involved, together with the GP, in the formation of chronic disease management plans. Periodic consultations with patients,

such as the quarterly and annual nursing review and devising a chronic disease management plan, are all opportunities for the PN, appropriately skilled, to facilitate the process of diabetes self management education. Integral to the ongoing process of diabetes self management education and care, are the elements of the "Seven Self Care Behaviours". The PNs' role in contributing towards this process will be discussed further in light of other studies.

Diabetes Self Management Education

In Australia, the minimum level requirement for health professionals to perform within the role of diabetes educator is completion of a post graduate certificate in a diabetes education related field of study. Following this is accrual of a defined number of professional clinical practice hours, continuing professional development and involvement in a mentoring partnership, in order to achieve credentialled diabetes educator status. Whilst most PNs would be unlikely to require this level of specialisation within their role, Giles, Cornelius, and Chittleborough (2006) suggest the Australian PN can become involved in the diabetes cycle of care, by providing introductory information on healthy eating principles, the benefits of exercise and weight control, and the importance of regular review by their GP of risk factors and health goals. The PN may also be able to initiate appropriate and timely referral for diabetes self management education as well as other referrals relevant to ongoing diabetes care.

The American Association of Diabetes Educators formulated the main focal points of diabetes education into Seven Self Care Behaviours deemed essential to improving health status and quality of life for those with diabetes.

The Seven Self Care Behaviours consist of:

- Healthy eating
- Being active
- Monitoring diabetes
- Taking medication
- Problem solving skills
- Healthy coping
- Reducing health risks.

(American Association of Diabetes Educators, 2009).

The American Association of Diabetes Educators emphasise the specialised role of the diabetes educator as assisting individuals to achieve effective self care behaviour (American Association of Diabetes Educators, 2009). The Seven Self Care Behaviours offer a framework for measurable best practice of diabetes self management education; incorporating positive lifestyle changes, quality of living and optimal health outcomes. Important also is the process of empowering individuals through teaching and encouraging problem solving skills and coping mechanisms. The Seven Self Care Behaviours was endorsed by the Australian Diabetes Educators Association in 2008. Similarly, the practice of the Australian diabetes educator is underpinned by a core body of knowledge, skills and competencies for the quality

assured provision of diabetes self management education (Australian Diabetes Educators Association, 2008).

Of the studies conducted in Australia of the role of the PN, the sample size has been small. When Lee and Stevenson (2007) surveyed 16 GPs, 7 PNs and 31 patients in Victoria to determine what they considered appropriate areas for PNs to provide diabetes education to patients, topics identified included monitoring blood glucose, blood lipid and microalbumin levels, blood pressure, dietary guidelines and complications. The authors found that the majority of PNs surveyed were involved in diabetes care, in particular dietary advice, self monitoring of blood glucose and complications. In another Australian study, 29 PNs in a rural area of NSW were asked about the diabetes education they provided to patients and found the most common topics were healthy eating, exercise, smoking cessation, self monitoring of blood glucose and weight reduction advice (Hollis, 2007).

Studies internationally have considered the role of nurses in diabetes care. Winocour, Ford, and Ainsworth (2002) surveyed the role of diabetes specialist nurses in the UK and found evidence of variations in their qualifications, day to day role and content of patient education programmes they offered. As a consequence they proposed a nationally coordinated approach to training, career paths and formal opportunities for regular training updates in diabetes care. The authors then surmised that with a move towards integrated diabetes care, PNs and diabetes specialist facilitators should work collaboratively in primary care, together with a proposed advanced role for hospital based diabetes specialist nurses, also acting as a resource to the community.

Overseas studies have identified that PN involvement in nurse led clinics does benefit patients with diabetes through the delivery of systematic care that includes; maintaining a recall system, updating records and outcomes of care from other health professionals, and providing patient centred education and advice on lifestyle issues (Kirby, 2005). Khunti, Ganguli and Lowy's (2001) study on the organisation of services in primary care in the UK, concluded that those operating a diabetes mini-clinic and using computerised recall, demonstrated measured outcomes as good as, or better than that achieved by care delivery in the hospital setting. Khunti et al. (2001) found 89% of general practices employed a diabetes recall system and 74% held a diabetes mini-clinic. In particular, having a recall system was associated independently with a GP or a PN with an interest in diabetes. One of the factors independently associated with having a diabetes mini-clinic was a PN having attended a diabetes course. The authors did not examine the type of course attended by the PN. Similarly, a smaller qualitative study conducted by Tolhurst et al. (2004) found that those practices with PNs who have an interest in diabetes were more likely to have a recall system and operate diabetes mini-clinics.

A randomised controlled trial in America showed that a nurse-implemented diabetes management program, supported by a primary care physician and endocrinologist, improved patient glycaemic control (Aubert et al., 1998). The nurse was a registered nurse/diabetes educator, who followed algorithms for medication adjustment, meal planning and reinforcement of exercise. The glycated haemoglobin was used as a measure of glycaemic control. Further to this, trials within the UK examining other chronic diseases have shown improved outcomes in blood pressure and blood lipid management or the reduction in overall mortality of patients with known coronary

heart disease, where PNs were directly involved in the recall and education of patients (Kirby, 2005). In some of these trials the PNs were involved in supplementary prescribing and were able to increase the dose of antihypertensive or cholesterol lowering medication.

Studies have looked at how PNs perceive their current and future roles. A two-round Delphi study was conducted in 2000 in Great Britain to identify the views of community and practice nurses, on their current and future role in the provision of care to people with type 2 diabetes (Peters et al., 2001). The respondents totalled 166 and comprised of 97 PNs and 69 Diabetes Specialist Nurses. The PNs surveyed within this Delphi study were considered generalists who provided diabetes care according to their employment conditions. Whilst much of the PNs and diabetes specialist nurses roles were similar, the diabetes specialist nurses were more likely to receive referrals for people with type 1 and gestational diabetes and more complex cases where other specialists were likely to be involved. The authors suggest a key conclusion to be drawn from this Delphi study is that PNs are inevitably generalists whose time spent in diabetes management will vary considerably between practices.

Further to this, when Tolhurst et al. (2004) conducted a qualitative study of 27 GPs and 15 PNs from 19 Australian general practices, they found that the PN role was mostly influenced by their own level of expertise, GP attitude and practice population characteristics. Those with expertise in diabetes self management education were said to be working in an extended role, providing education for patients and families. However, in areas where services such as diabetes self management education were readily available through other health professionals, the

PNs tended to be less active in this area. The authors also observed that the PN was becoming more involved in chronic disease care planning for patients with chronic conditions such as diabetes. This can most likely be attributed to the evolution of the chronic disease management MBS item numbers for general practice. Condon, Willis, and Litt (2000) carried out an exploratory qualitative study interviewing GPs and PNs within 10 general practices in rural and metropolitan South Australia. They found that PNs in rural areas performed a wider range of activities than those in urban practices. However, in contrast, a larger Australia wide study of 222 PNs, found no substantial difference in the workforce characteristics and roles between rural and urban PNs (Pascoe et al., 2005).

EDUCATIONAL PREPAREDNESS OF THE PRACTICE NURSE

To date there is little documented data on the current level of education, expertise and role of Australian PNs in the area of diabetes care. It is widely accepted that PNs will most likely be required to have a diverse range of skills to meet the needs of patients across all ages and health requirements, this being the nature of general practice. The PN role will also very likely be influenced by the specific requirements of individual GPs as well as the region serviced by the general practice centre.

When Watts et al. (2004) sought to examine the educational preparation of Australian PNs; they found that opportunities for education to prepare for this nursing area generally were likely to be opportunistic and variable. Any education undertaken was largely informal and ad hoc in nature. Generally PNs obtained the necessary general practice clinical education and skills on the job (Watts et al.,

2004). In terms of educational opportunities for PNs, barriers to gaining education have been highlighted in the literature. The results of a telephone survey of Australian PNs by Pascoe et al. (2007) highlighted that barriers to undertaking further education were lack of time (22%), costs for courses (17%) and distance to travel for courses (14%). The authors identified the need for the PN role in Australia to be supported as it is in other countries, through easier access to ongoing education and training and the development of a professional infrastructure that includes career and educational pathways.

There is some evidence within the literature that a real or perceived deficit in PN knowledge or clinical skills impacts upon their role. Greaves et al. (2003) explored the views of 25 PNs in the UK about therapeutic management changes for people with diabetes. The researchers found that whilst most of the nurses felt converting to insulin in the primary care setting had considerable benefits for their patients, they identified the main perceived barriers to insulin conversion in primary care were time, training and confidence about performing the change. Other studies have similarly found lack of training was a barrier to a medication adjustment role for PNs (Lee & Stevenson, 2007; Wagner at al., 2001). Furthermore, an Australian study explored the PN role in cardiovascular disease management in primary care and found lack of training (21.5%), underdeveloped clinical skills (13%) and lack of clinical confidence (8%) were barriers to the PN role expansion (Halcomb et al., 2008). In particular Pierce, Agarwal and Ridout (2000) surveyed diabetes care in general practice in the UK and concluded that whilst PNs were largely involved in diabetes care, including running diabetes clinics, the authors expressed concern over the level of educational preparedness of those providing the care.

Similarly, Kenealy et al. (2004) found amongst New Zealand PNs an inconsistency in their roles, training and competency, making it difficult to assess their ability to provide diabetes care. When Kenealy et al. (2004) reviewed the role of New Zealand (NZ) PNs in 1990 and again in 1999, they found a markedly increased level of involvement in what they classified as more complex aspects of diabetes care such as glucose self monitoring and sick day management. At both points in time PNs were likely to be providing dietary advice. The authors concluded that developments in NZ primary health funding over a decade led to an expansion of the PN role by supporting the delivery of health care by PNs. The degree of educational preparedness and ongoing professional update, delivered in a timely manner as PNs expand their role, has been raised in the literature (Kenealy et al., 2004; Pierce, Agarwal & Ridout, 2000; Watts et al., 2004). McDonald, Tilley, and Havstad (1999) found in their study of nurses providing diabetes care in outpatient and primary care settings, that 28% reported no updates on diabetes for registered nurses in the preceding 2-15 years.

Australian PNs may access a range of courses in diabetes self management education that afford the necessary knowledge and skills development to expand their role in this area. Recently tertiary courses have been developed through Australian universities that are tailored to suit generalised skill requirements for nursing in general practice, or alternatively practice nursing units have been developed within the context of other post graduate courses. Formal tertiary studies include the Graduate Certificate, Post Graduate Diploma and a Masters program in diabetes education. Shorter courses exist such as the National Association of Diabetes Centres; "Diabetes Management in the General Care Setting: A National Training

Program for Nurses and Allied Health Professionals". Additionally the Divisions of General Practice currently facilitate professional updates and in-service education in diabetes management and monitoring skills particularly relevant to the PN role. Some other clinical education programs available to PNs have not historically been evaluated, however in recent years the introduction of short accredited courses, such as those offered by the Australian Practice Nurses Association have been developed (Watts et al., 2004). Hall (2007) further highlighted the important and unique role of Australian Divisions of General Practice in fostering the development of general practice teams and advocating for the ongoing professional development of PNs for their role in multidisciplinary care.

BARRIERS AND FACILITATORS TO EXPANSION OF THE PRACTICE NURSE ROLE

Australian and overseas studies have revealed that the PN role in primary care can be influenced by many different factors that have the capacity to change the boundaries of nursing in general practice (Patterson & McMurray, 2003). Halcomb et al. (2005) identified funding arrangements for general practice, changing heath care needs of consumers, increasing GP workloads and a shortage of GPs in some locations as factors driving change within the PN role. Furthermore, issues such as an ageing population and the multiple comorbidities associated with chronic diseases create a greater burden on primary health services as well as the tertiary centres. The PN in the primary care general practice setting is uniquely placed to improve the health outcomes for those with diabetes.

As previously discussed, a model of primary health care delivery needs to facilitate the changing focus of health care from acute, episodic care to chronic disease care needs. What drives change and the rate at which this progression evolves needs to be understood in order to strategically guide this process. Harris (2002) suggests a distinction needs to be made between change that is "incremental", occurring over prolonged periods or "fundamental", occurring rapidly. According to Harris, both types of change can be viewed as either reactive or proactive "imposed by external forces or made voluntarily" (2002, p.147). The introduction of MBS item number funding strategies for PN activities is an example of a catalyst for change in the role of the PN within primary care. Medicare funding has facilitated an expansion of the PN role within specific skill areas including wound care, immunisations and sexual health. Senior (n.d.), reported on a qualitative survey of 22 practice nurses working in general practice in Victoria, which showed PNs moved into expanded roles in response to development of these MBS item numbers.

Keleher, Joyce, Parker and Piterman (2007) address the issues surrounding Australian Government initiatives currently facilitating the expansion of the PN role. The authors highlight the need for further investigation of the PN role and the adoption of a suitable model for advancing PN skills, knowledge and level of contribution, which is measurable in terms of efficiency and patient outcomes. Wagner et al. (2001) also proposed that consideration needs to be given to what extent practice teams, including GPs and PNs, have the necessary expertise and resources to act, as opposed to react, to changing interventions in chronic disease management, such as the methodology proposed in implementing the chronic care model.

The extent to which an expansion of the PN role is reactive to changes in Medicare funding needs to be examined in light of the level of PN preparedness to take on new roles. The concern has already been expressed by stakeholders that an expanding role for PNs in reaction to current Australian primary health funding, may result in demand for PNs to primarily perform tasks related to specific MBS item numbers (Armstrong, 2005). This being due to the fact that they attract financial reimbursements. Nevertheless, a more holistic expanded role for the PN within the multidisciplinary team may be facilitated, through the implementation of the Chronic Care Model.

Health funding has previously been identified as a barrier to implementing organisational change in chronic health care delivery within Australia and overseas, by way of lack of reimbursement for primary care service providers, including non medical personnel (Bodenheimer et al., 2002; Kenealy et al., 2004; Wagner et al., 2001; Watts et al., 2004). Other researchers similarly found that a lack of financial recognition for the role of the PN, together with a lack of professional responsibility due to delegation by the GP rather than a shared care approach were key inhibiting factors for PNs (Kenealy et al., 2004; Peters et al., 2001). Halcomb et al. (2008) found, in their study of the PN role in cardiovascular disease management that GP attitudes acted as a barrier (29%) to expansion of the PN role. This was attributed to the GPs limited understanding of the PNs' clinical skills and scope of practice and concerns regarding litigation issues if the GP did not directly supervise the PN. The authors also found medico legal issues (52%), poorly defined scope of practice, communication problems and the restrictions of current funding models, limited collaboration between GPs and PNs. Halcomb et al. (2008) also found another

barrier to the expansion of the PN role in cardiovascular disease management was lack of a protected space (31%), limiting their ability to consult privately with patients despite 94% having a general treatment area. A dedicated private consulting area as opposed to an open treatment room is important for facilitating self management education and counselling in chronic disease management. Senior (n.d.) also found that lack of space and time were barriers to the expansion of the PN role, beyond just the completion of tasks. Furthermore, Senior (n.d.) recommended that a protected workspace for PNs warrants consideration in the design of future general practice centres. Funding has been identified as one area that could facilitate systematic as opposed to reactive care delivery through changing the physical infrastructure of the practice setting to allow space for diversification of the PN role (Harris & Zwar, 2007).

Funding issues notwithstanding, Harris and Zwar (2007) suggest that factors that could be seen to influence or restrict the development of multidisciplinary team care can be addressed through the chronic care model. An expansion of the role of the PN resulting from changes in the model of care delivery may be met with varying responses from GPs, practice staff, patients and PNs themselves. The organisation and planning required to successfully operate a team under a different model of care may be faced with challenges such as already overworked staff and the need to allow time for communication and the development of new skills (Australian General Practice Network, 2007).

Harris (2002, p.145) highlights two potential problems faced by health care organisations in the implementation of change; Firstly "how to determine the need

for and scope of change", and secondly "how to manage the transition process to a sustainable result". Further to this is the need to identify patient requirements, as optimum care for chronic diseases such as diabetes will generally necessitate a degree of ongoing and periodic input from a range of health providers, with the GP the most likely to be responsible for coordinating this care. The level of support by GPs and other practice management staff will also influence the role of the PN. The primary care team, in particular PNs, must have the necessary expertise and resources, such as that suggested within the chronic care model, along with guidelines or protocols to facilitate and maintain consistency in care (Wagner et al., 2001; Watts et al., 2004). The question remains how an expanding role for PNs will be supported by appropriate ongoing training and education. In order for the PNs to fully utilise their skills to help optimise the care of people with chronic disease, the model of care delivery needs to support a collaborative relationship within the general practice team.

Diabetes is clearly one area where PNs have the potential to contribute significantly towards optimising the care of their patients with chronic disease within the primary care setting. The current and projected need for increased primary health care services, particularly in diabetes care, is indicative of the need for greater utilisation of the skills of PNs. Chronic disease management, in particular diabetes, is an important worldwide priority and the evidence suggests it has the potential to be effectively managed through a multidisciplinary chronic care model in primary health. On this basis, and in view of the growth of the Australian PN workforce, their inclusion in the organisational planning of primary health presents as a timely and appropriate strategy. The specific role and responsibilities of WA practice nurses in

diabetes management, along with their degree of educational preparation in this area, is not well researched. The current study aims to add to this knowledge base.

In terms of an expansion of the PN role in diabetes care, there is clear evidence from studies overseas suggesting the existence of common barriers and facilitators to this and towards their inclusion within a multidisciplinary model of care delivery. What is not well known is how these barriers and facilitators apply within the Western Australian primary health context as perceived by WA practice nurses. The current study will add further insight to this.

The following chapter will now outline the methodological approach to undertaking this study. Included in this will be the research design, method of analysing the data and the ethical considerations for this study.

CHAPTER 3

METHODOLOGY

The role of PNs within Australia is evolving, with their responsibilities and scope of practice expanding to meet different health demands. Chronic disease management is one such area, which will very commonly involve diabetes. As discussed in chapter 1 PNs are ideally positioned in the primary health care setting of general practice to assume a role in diabetes self management education and care. However, they may not necessarily have the required knowledge, or clinical skills, to accommodate this expanding role. This study was designed to investigate how PNs in Western Australia are currently involved in diabetes care and their degree of educational preparedness to fulfil this role. This chapter outlines the project methodology, including research design, analysis and ethical considerations for this study.

RESEARCH DESIGN

A cross sectional design, involving a postal survey, was used for this study. This type of design is commonly used in the social sciences because it is considered most suitable to describe a phenomenon or situation as it currently stands, such as the one under investigation in the present study (Kumar, 2005). In addition, this design provides a relatively quick and inexpensive way of gaining information. However, some weakness lies in its inability to measure change, having only one point of data collection (Kumar, 2005). Although this is a significant weakness, this study is not attempting to establish causation or change over time, thus it was still considered a

suitable design for the present study. A postal survey was considered the most appropriate data collection methodology given the geographical distribution of the population under investigation, which will be described later. Western Australia (WA) was considered to be representative of most other Australian states, having a population dispersed between rural, remote and metropolitan regions. In spite of the extensive geographical area of WA, state wide access for data collection purposes was achievable through the Western Australian Divisions of General Practice. The survey was designed to collect both quantitative and qualitative data to provide information to address the study purpose.

PARTICIPANTS

Participants for this study included both registered and enrolled nurses working within a general practice setting in WA between October 2006 and January 2007. Recruitment occurred with the assistance of the Western Australian General Practice Network (WAGPN). The WAGPN provided contact details of a representative for each Division of General Practice. These representatives had access to a PN database and were able to forward the surveys to PNs in their division. The divisions are clarified in the next section. All PNs employed to work in a general practice centre that was affiliated with its area Division of General Practice were invited to participate in the study.

The WA Divisions of General Practice have an extensive membership, representing approximately 95% of General Practitioners (GPs). The GPs are affiliated with the

organisation through their local division (WAGPN, 2007). Surveying across all of the WA Divisions of General Practice would permit recruitment across the geographical locations forming Western Australia. This would allow analysis to determine any differences in outcomes relative to geographical location. Thus it was felt that recruiting through this organisation would provide the greatest and most representative access to the majority of PNs. At the time of data collection, in late 2006 early 2007, the population of PNs working in general practice within WA was known to be at least 700 (WAGPN, personal communication, September, 2006).

Using this channel for recruitment may have excluded some PNs who were not affiliated with their local Division of General Practice. With this in mind other means of accessing the total population were considered. The other potential means was through the Western Australian Practice Nurses Association (WAPNA) which was formed in 2002. However, recruitment numbers achievable through WAPNA was considered to be much less by comparison with the WA General Practice Network. In addition, access through both organisations was prohibitive. Given the possibility of dual alignment with the Division and the WAPNA, the likelihood of participants receiving two copies of the survey meant this process was prohibitive in terms of cost and time. Therefore, the decision was made to access PNs through the Divisions of General Practice given its greatest reach.

WA DIVISIONS OF GENERAL PRACTICE

In 1992 the concept of Divisions of General Practice in Australia evolved under the guidance of the Divisions Steering Group (now known as the Divisions Strategy Group) by the General Practice Consultative Committee. This was a joint Royal Australian College of General Practitioners (RACGP), Australian Medical Association (AMA) and Commonwealth Government group. The purpose for this association was to create a link between GPs and other primary and community health care providers, which would offer benefits to patients and their health care providers. There is currently a network of organisations comprising 121 local Divisions of General Practice supported by eight states based organisations and an Australian General Practice Network (AGPN) which is the national peak body (Australian General Practice Network, 2007).

At the time of the study, within the WAGPN, there were fourteen Divisions of General Practice. Eight of these were rural and six urban divisions. In 2008 the two divisions of Perth and Hills and GP Coastal amalgamated to form one. Figure 3.1 illustrates the geographical location of the eight rural Divisions of General Practice and Figure 3.2 illustrates the five urban Divisions of General Practice in WA (WAGPN, 2009).

WA Rural Divisions Of General Practice:

610 Kimberley Division of General Practice

614 Pilbara Health Network

612 Midwest GP network

611 Goldfields Esperance GP Network

615 Wheatbelt GP Network

609 Great Southern GP Network

607 GP Down South

613 Greater Bunbury Division of General Practice
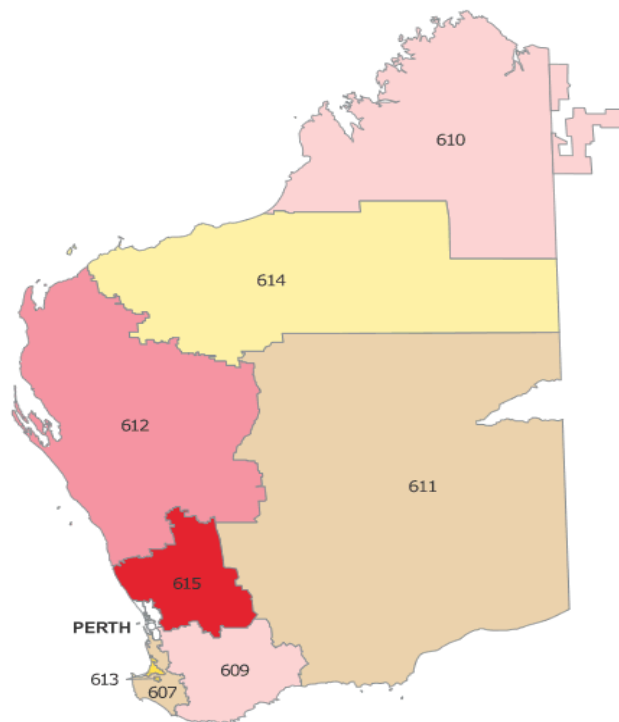
Figure 3.1. **WA rural divisions of general practice**

Note. **From WA General Practice Network (2009).**

WA Urban Divisions of General Practice:

603 Osborne General Practice Network Ltd

601 Perth Primary Care Network

602 Perth Primary Care Network

605 Fremantle GP Network Ltd

604 Canning Division of General Practice

606 Rockingham Kwinana Division of General Practice
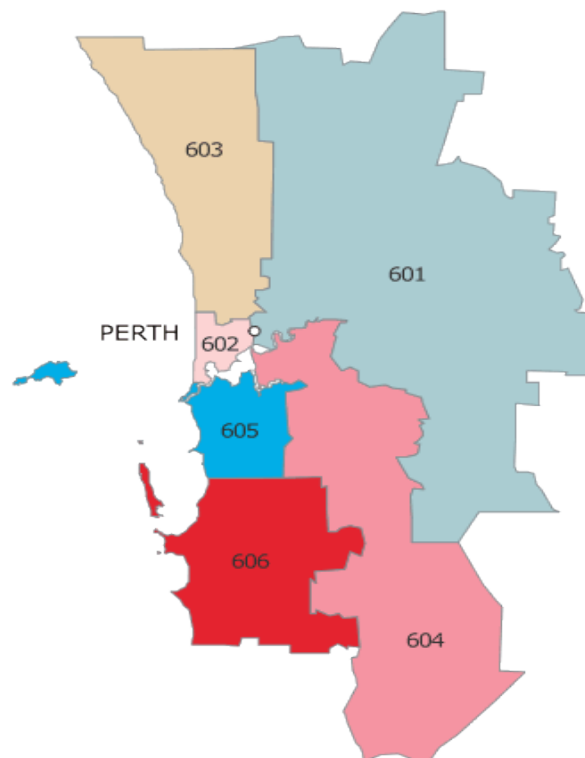
Figure 3.2. **WA urban divisions of general practice**

Note. **From WA General Practice Network (2009).**

DATA COLLECTION

The WAGPN was approached and the Program officer for nursing in General Practice supported this research by assisting to distribute the surveys. Due to privacy restrictions the WAGPN were unable to provide workplace and contact details of the PN's directly to the researcher. Each Division of General Practice had a PN project officer who was supplied with sealed, stamped envelopes for dissemination to the PNs who were on their individual division's mailing lists. From the data base the project officer generated private addressographs for each PN; these were attached to the envelopes prior to posting. Each envelope contained a survey, project information sheet and a reply paid envelope for the return of the completed survey. Surveys were requested to be returned to the WAGPN state office by 17 November 2006. The surveys were stored securely un-opened until they were collected by the researcher.

During the months of October and November 2006, 758 surveys were distributed to PNs. By the end of 2006, there were 98 surveys returned by post; providing a response rate of 13%. In an attempt to improve the response rate, two reminder emails, with the survey provided as an attachment, were distributed to the PNs, through each Division's email network. The emails were designed to appeal to the interest of the PNs, in terms of the relevance of the research to their role, highlighting some association the researcher had with this role at the time. The first reminder email was sent on the 15 April 2007 and the second was sent on the 2nd May 2007 (Appendix A). The email messaging was facilitated again by the project officers.

This process prompted the return of another 20 completed surveys, bringing the final number to 118, making the return rate 16%. Based on the population size of PNs in WA, the sample size required to be representative of this population at the time was estimated to be 255, at a 95% confidence level, standard error 5% (National Statistical Service, 2007). Unfortunately, a low response rate is not unusual in a mailed questionnaire due to minimal personal contact with respondents (Ott, 1993). In effect the final response rate was 118 respondents, with a 95% confidence level; the standard error for the study sample size is 8.5 % (National Statistical Service, 2007). Whilst a greater sample size was required to be fully representative of this population, the information derived from the variables will be discussed in Chapter 5 in terms of population representativeness.

INSTRUMENT

The survey used in this study was a compilation of three existing instruments that were considered the most appropriate in order to obtain the necessary information (Appendix B). The survey comprised of four different sections:

Part A. Demographics

Part A consisted of seven questions focused on general demographic information of the PNs including, location as determined by postcode, formal nursing qualifications, formal post graduate studies completed or currently undertaking and how long they have worked as a PN. Questions specifically related to diabetes included formal

studies undertaken in diabetes education and proportion of work hours spent by the PN in diabetes related work.

Part B Role of Practice Nurse

Seventeen questions considered the PN's specific role and scope of practice in the form of clinical monitoring of diabetes, complication screening, education and diabetes management needs. Their contribution to practice protocols, patient recall systems and referral to specialist services was also requested. Included in this section were two open ended questions to gather information on barriers and driving forces in their ability to provide diabetes care. This part is reproduced from a questionnaire by Peters, from the University of Sheffield, United Kingdom (UK) (Peters et al., 2001). Peters and colleagues used this questionnaire to study the current and future contribution of community nurses and PNs in the management of type 2 diabetes in the UK. Permission to use this tool was granted by Peters.

Part C Diabetes Knowledge Test

In order to identify current knowledge and understanding of diabetes education and management principles the Diabetes Knowledge Test (DKT) was used. This instrument, developed by the University of Michigan Diabetes Training and Research Centres, contains 23 items that represent a multiple choice style test of general knowledge of diabetes. The questions include content on dietary management, insulin therapy, foot care, long term complications and self monitoring of blood glucose

levels. The developers state that the Cronbach coefficient alpha value demonstrate reliability ($\alpha \geq .70$) (Fitzgerald et al., 1998). Permission to use this tool was granted by the University of Michigan Diabetes Training and Research Centre.

Part D Attitudes of Practice Nurse

A questionnaire was used to assess factors that facilitate, or inhibit, PN involvement in patient education, as well as the level of priority placed upon this role. The questionnaire, "Survey of Factors Influencing Patient Teaching" was originally developed by Honan, Krsnak, Peterson, and Torkelson. Permission to use this tool was granted. The instrument employs a 14 item Likert scale from 1 = "strongly disagree" to 5 = "strongly agree", to examine the degree of importance placed by the nurse on their role in the provision of diabetes education. The content reliability was established by a panel of experts from South Dakota State University (Marcum, Ridenour, Shaff, Hammons, & Taylor, 2002). The authors' state two subsequent replication studies revealed similar findings to the original study, supporting the tool's reliability. No Cronbach alpha statistic is reported. Two final open ended questions provided an opportunity for the respondents to list any further factors that currently assist, or restrict them, in providing diabetes care and education in their practice setting.

STATISTICAL ANALYSIS

The Statistical Package for Social Sciences 15.0 (SPSS) was used for data entry and analysis. Descriptive statistics were calculated to analyse nominal data, including percentages and frequencies. The mean and standard deviation were calculated for DKT and Attitude scores. The Kolmogorov-Smirnov statistic (with Lilliefors correction) was used to test the assumption of normality. Where normality of distribution was assumed, parametric testing (t-tests) were reported on. Mann Whitney U tests were used where normality of distribution was not assumed. Pearson's chi-square was used for categorical data where comparisons were made between groups.

ETHICAL ISSUES

Permission to conduct this study was obtained from the Human Ethics Committee, Curtin University on June 2nd 2006 (HR SON&M10-2006) through submission of Form C (Appendix C). The Form C is for research involving low or negligible risk, with the potential for respondents to suffer no harm, only inconvenience. This project was also approved by the WA General Practice Network (Appendix D). Respondent involvement in the study was completely voluntary, involving no coercion. No viewing of patient data or records was necessary for the purpose of this study. An information sheet outlining the study was provided for all participants (Appendix E). Participants were assured in this way, at the outset, that confidentiality and anonymity would be maintained. Completion and return of the survey was considered implied

consent, with participation anonymous and personal identification details not required or recorded. All questionnaires are, and will continue to be kept in a locked cupboard, at the researcher's office at a tertiary hospital, where they will be kept secure for five years from the date of completion after which time they will be destroyed.

This chapter has outlined the design of the study, along with the methodological approach to the collection of data. Further to this, an outline has been given of the method of statistical analysis of the data. The next chapter will present all of the results obtained from the collection of the survey data.

CHAPTER 4

RESULTS

This chapter presents the findings of the study to determine the ways in which PNs are involved in contributing to the care of patients with diabetes, in the primary care setting of general practice in Western Australia (WA). This chapter is structured into several sections. The demographics of the study participants will be presented first followed by the findings of the study as they apply to the research objectives.

INTRODUCTION

The purpose of the study was to gather information on the diversity and extent of the roles and responsibilities of PNs in diabetes self management education, together with their specific educational preparedness for this role, and to identify the driving and restraining factors influencing their diabetes-related scope of practice within the WA general practice setting. The first objective was to describe the current roles, responsibilities and competencies of PNs in diabetes self management education. To address this, data was gathered on specific clinical tasks performed and diabetes related patient education provided by PNs. The second objective was to determine the educational preparedness of PNs for having a role in diabetes self management education and monitoring. In addition, the Diabetes Knowledge Test (DKT) from the University of Michigan was included as a means for measuring general knowledge in diabetes self-management principles. The third objective sought to identify driving

and restraining factors influencing the involvement of PNs in diabetes care. A Likert scale questionnaire was used to examine factors that enhance or inhibit PNs involvement in diabetes education. All statistics are reported at a significance level of alpha equal to 0.05.

SAMPLE

A total of 758 surveys were posted out to PNs in urban and rural areas across WA covering each of the 13 divisions of general practice in WA. The number of completed surveys returned was 118, making the response rate 16%.

DEMOGRAPHICS OF STUDY PARTICIPANTS

Participants in this study comprised Registered Nurses ($n = 85$, 72%), Registered Midwives 16 (14%) and Enrolled Nurses 13 (11%). One (0.8%) Registered Nurse was a Credentialled Diabetes Educator (CDE) and 3 (2.5%) indicated their position was that of Nurse Manager.

The post graduate preparation of respondents was varied, showing a mix of skills being taken into the general practice setting. Post graduate courses completed were principally those that have particular relevance to the scope of practice of the PN. The main courses undertaken were in asthma education 20% ($n = 24$), immunisation 14% ($n = 17$) and sexual health/pap smear 12% ($n = 14$). Other post graduate studies

included paediatrics 6% (*n* = 7), emergency/critical care nursing 5% (*n* = 6), counselling 2.5% (*n* = 3), coronary care 2.5% (*n* = 3), practice nurse coursework 2.5% (*n* = 3) and masters in nursing 2% (*n* = 2). Information was not obtained on the details of the coursework, or type of training centre, only that the PN had obtained the post graduate qualification.

Of the 118 respondents, 88% identified the Division of General Practice their workplace was affiliated with. Of those respondents who provided this information, 70 % (*n* = 82) were from an urban area and 30% (*n* = 35) were from a rural division. The rural divisions are the: Central Wheatbelt, Eastern Goldfields, GP Down South, Great Southern, Greater Bunbury, Kimberley, Mid West, and Pilbara Division of General Practice. The urban Divisions of General Practice are Canning Division, Fremantle GP Network Ltd, Perth Primary Care Network, Osborne GP Network Ltd and Rockingham Kwinana Division of General Practice. Figure 4.1 shows the breakdown of the number of respondents from each division of general practice. The only division of general practice not represented in the study was the Central Wheatbelt due to absence of returned completed surveys from within this group. For the purpose of displaying the data, the divisions are categorised in Figure 4.1 as per the 13 current divisions.
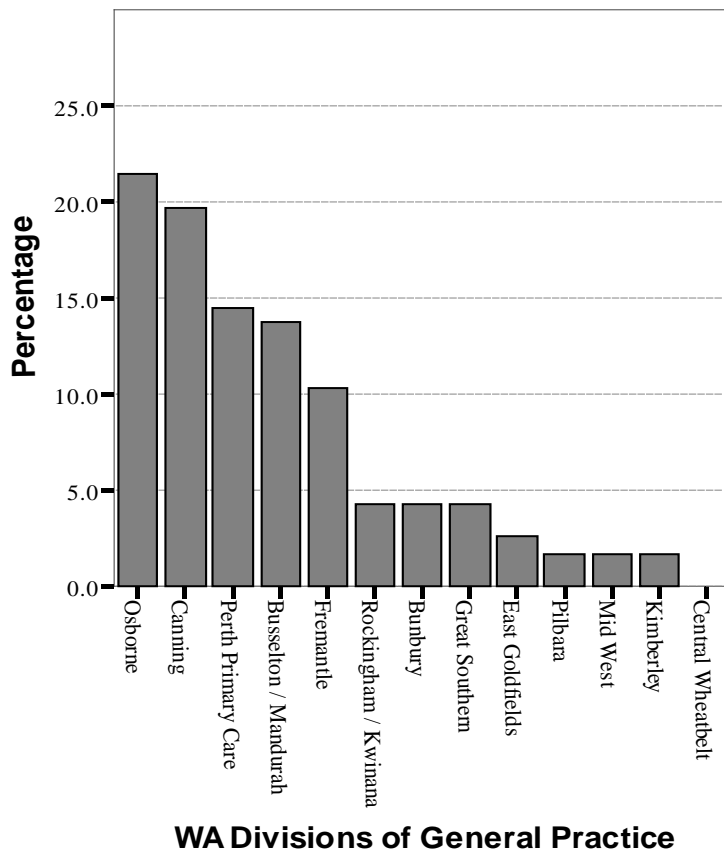
Figure 4.1. **Percentages of respondent practice nurses in divisions of general practice.**

The duration of employment as a PN varied among the sample. As shown in Figure 4.2, 47% (*n* = 54) had worked as a PN for less than five years, 22% (*n* = 26) had worked for 5 to 9 years, 13% (*n* = 15) for 10 to14 years and 18% (*n* = 21) for greater than 15 years.
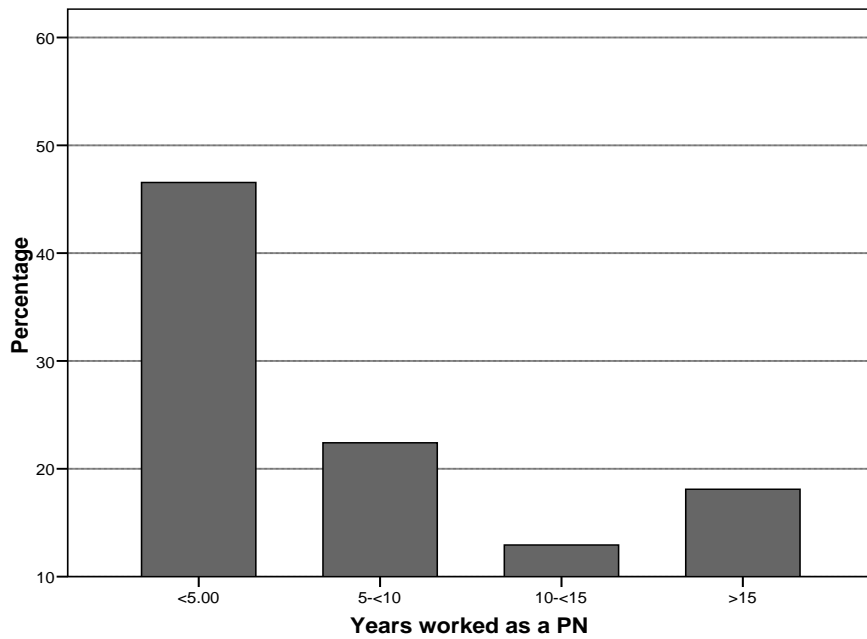
Figure 4.2. **Employment as a practice nurse.**

The numbers of hours PNs were employed to work each week showed the vast majority worked in a part time position. Twenty six percent (*n* = 30) were employed to work less than 20 hours, 58% (*n* = 67) worked up to 34 hours and 16% (*n* = 19) were employed to work over 35 hours per week.

The mean estimated time that PNs spent in diabetes related work was 4.5 hours each week (*SD* ± 4.58), with a range of zero (*n* = 4) to a maximum of 25 (*n* = 1) hours. Twenty two percent (*n* = 19) spent two hours, 18% (*n* = 16) one hour and 10% (*n* = 9) ten hours per week in diabetes related work. A small number of respondents indicated that it was too difficult or not possible for them to estimate the number of hours per week spent in diabetes related work. This may account for why thirty respondents did not provide this information at all.

Respondents were asked how many years they had been involved in providing diabetes related care in the general practice setting. As illustrated in Figure 4.3 a little more than half of the respondents (52%, $n = 54$) had been involved in diabetes related care for less than five years. Twenty five percent ($n = 26$) had been involved in diabetes related care for five to nine years. The minimum number of years PNs had spent working in diabetes related care was zero ($n = 3$) to a maximum of thirty one ($n = 1$) years. The mean number of years that PNs indicated they had been providing diabetes care in the general practice setting was 6 years ($SD \pm 5.99$).
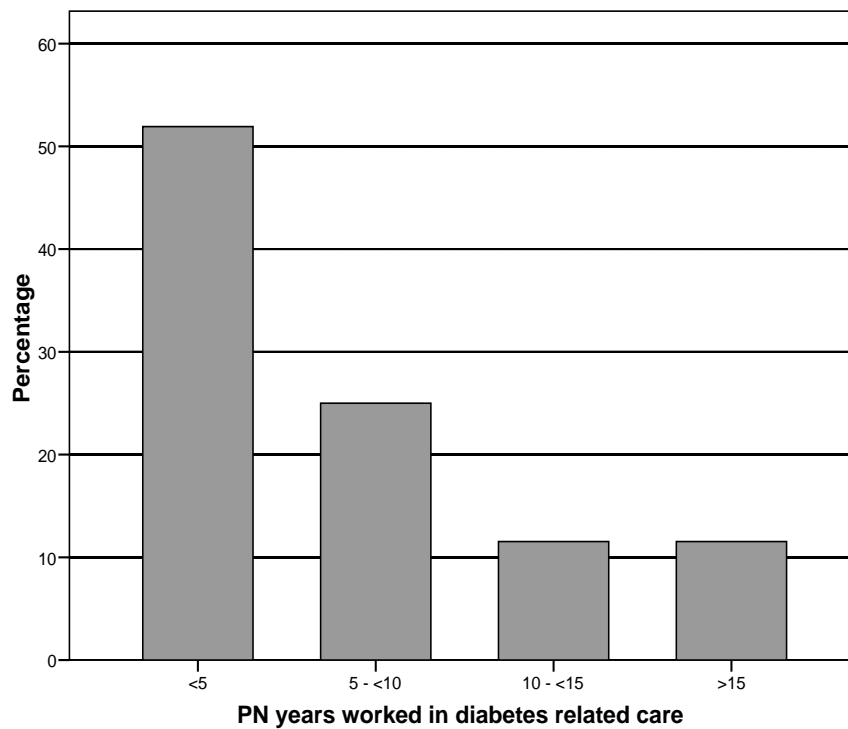
Figure 4.3. **Practice nurses years in diabetes related care.**

ROLE OF THE PRACTICE NURSE

The first objective of the study was to describe the existing roles, responsibilities and competencies of PNs in diabetes self management education. Part B of the survey collected data to address how PNs were contributing to the management of type 2 diabetes within their practice setting. This part is reproduced from a questionnaire by Peters, from the University of Sheffield, United Kingdom (Peters et al., 2001).

General Practice Setting

Eighty five percent ($n = 94$) of respondents indicated their practice had a register identifying patients with diabetes. Of those with a register, 58% ($n = 53$) could differentiate between patients with type 1 and type 2 diabetes; this was not possible in the remainder. Seventy five percent ($n = 83$) of PNs indicated they had a role in operating a recall system for patients with diabetes.

Practice nurses were consulting with patients in various different ways. The commonest opportunity for PNs to see patients with diabetes was "*during a one to one consultation at any time*" (62%, $n = 70$). A further 17% ($n = 19$) indicated they saw patients more opportunistically, following a specific request from a GP; for example, being asked to perform a random blood glucose test, provide written information for a patient just diagnosed with diabetes, or for the PN to become involved in the setup or review of a GP Management Plan. Another 4% ($n = 5$) saw

patients within a diabetes clinic setting and 1% ($n = 1$) during a group education session. Another 7% ($n = 8$) indicated that they saw patients during a diabetes clinic as well as on a one to one consultation at other times. Further to this, 3% ($n = 3$) indicated they had a Diabetes Nurse who visited their practice.

The current study established the PNs capacity for auditing diabetes care in the general practice setting. Few PNs (16%, $n = 19$) had been involved in a clinical audit of any aspects of diabetes care within the previous twelve months. The majority indicated they had not undertaken this role (83%, $n = 96$). Further to this, forty percent ($n = 46$) of respondents indicated they were involved in screening of at risk groups for diabetes. Twenty six of these respondents indicated that this screening occurred as part of annual blood testing/checkups, 7 for patients new to the practice, 4 for obese patients and 2 PNs indicated screening for at risk antenatal patients.

Few PNs made comment on the availability of protocols within the practice to guide diabetes self management education. Of those who responded, 18% ($n = 21$) indicated they had a practice protocol for managing or advising on smoking cessation, 16% ($n = 19$) hypertension management, 16% ($n = 19$) weight reduction, 14% ($n = 16$) for exercise routines and 14% ($n = 17$) for adjusting diabetes medication.

Diabetes Self Management Education Role

PNs were asked if they were able to have a role in referring their patients to specialist and allied health professionals. However, the question did not specify that the PN did

this within the context of a chronic disease care plan. Figure 4.4 shows that the most likely referral able to be made by a PN would be to a diabetes educator ($n = 59$), followed by podiatrist ($n = 53$), dietitian ($n = 50$), ophthalmologist/optometrist ($n = 29$) and endocrinologist ($n = 12$).
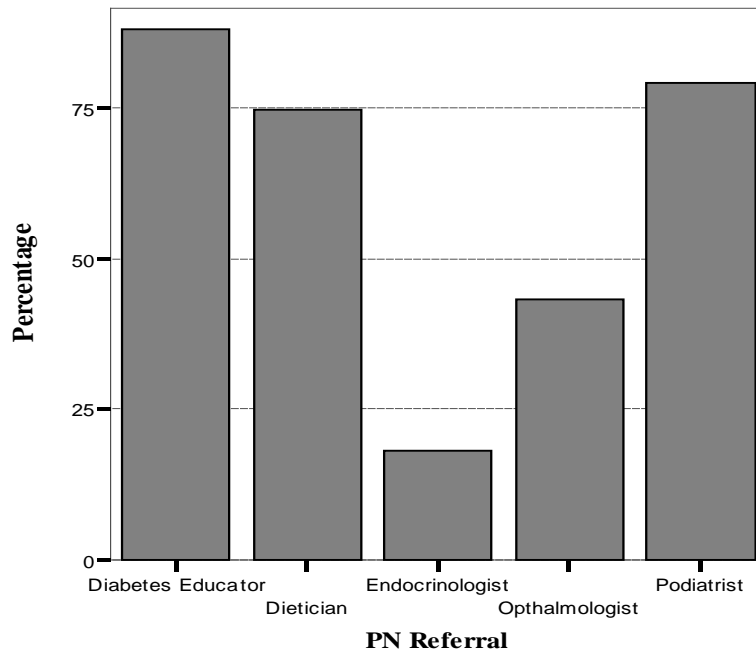
Figure 4.4. **Referrals made by practice nurses.**

The role of the PN in diabetes care is diverse. Table 4.1 summarises the involvement of PNs in various monitoring and education roles for patients with type 2 diabetes.

Table 4.1

The Practice Nurse Role in Type 2 Diabetes Education and Monitoring

Monitoring Role	Undertaking Activity (%)	*n*
Monitoring blood glucose levels	84	90
Weight	80	89
Blood pressure	77	84
Foot care	62	66
Visual acuity	53	55
Sexual function	17	15
Educational Role		
Healthy eating	85	93
Exercise	83	86
Weight reduction	81	83
Stop smoking	80	83
Self monitoring of blood glucose levels	72	76
Sick day	56	54
Insulin initiation education	20	23
Insulin dose adjustment based on glucose levels	9	10
Insulin dose adjustment based on clinical judgment	6	7

Findings suggest high levels of PN involvement in the areas of blood glucose monitoring (84%, $n = 90$) and providing dietary advice (85%, $n = 93$). The lowest involvement by the PN was in the area of assessing sexual functioning (17%, $n = 15$), which relates to complications of sub optimally controlled diabetes. Only 14% ($n = 16$) of PNs who did not monitor sexual functioning indicated they would like to provide this care, although 28% ($n = 33$) indicated they needed more training in this area of complication screening.

With regards to their role in diabetes self management education, 64% indicated that they assessed patients' education needs. The majority of respondents had a role in

providing education on healthy eating (85%, *n* = 93), exercise (83%, *n* = 86) and weight reduction (81%, *n* = 83). Just over half (56%, *n* = 54) of PNs advised patients on managing "sick days"; illness often has an adverse effect on blood glucose levels, potentially requiring short term changes to therapy. However, the education topics concerning insulin administration, its initiation and adjustment were much less commonly carried out by the PN, with 35% (*n* = 40) indicating they attended to some of these educational needs. Twenty percent (*n* = 23) of PNs provided education to patients when insulin therapy was first initiated. Of those not providing this type of education, only 18 participants indicated that they would like to perform this role.

EDUCATIONAL PREPAREDNESS OF PRACTICE NURSES

As per the second objective the educational preparedness of PNs in diabetes related knowledge and skills was ascertained. Of the known courses, 3.4 % (*n* = 3) of PNs had completed the university award course of Graduate Certificate in Diabetes Education, 2.3 % (*n* = 2) had completed the university award course of Post Graduate Diploma in Diabetes Education and 39.1 % (*n* = 34) had attended a 3 day diabetes generalist course. Thus 55.2 % (*n* = 48) of respondents indicated they had not completed diabetes related continuing education in any of the categories listed above. There was a statistically significant association found between those PNs who had completed diabetes related continuing education and the greater likelihood of providing education to patients in the areas of insulin initiation, χ^2 (1, *N* = 112) = 8.65, *p* = .004, self monitoring of blood glucose, χ^2 (1, *N* = 105) = 8.07, *p* = .003, dietary

advice, χ^2 (1, $N = 109$) = 6.76, p = .006, exercise, χ^2 (1, $N = 104$) = 7.69, p = .003 and sick day education, χ^2 (1, $N = 97$) = 7.68, p = .005.

Diabetes Knowledge Test

The Diabetes Knowledge Test (DKT) included in the survey, assisted in gaining an understanding of each PN's knowledge in diabetes management and therefore consideration of their degree of preparedness in teaching different aspects of diabetes self management education. There are 23 items in the DKT forming two subscales, covering general knowledge as well as insulin therapy related knowledge. A typographical error occurred within one item related to insulin therapy that initially went undetected, so the decision was made to remove this question from future analysis as it could be misleading. For the purpose of interpreting the results of the DKT, items have been grouped under four categories; diet, blood glucose monitoring, and complications of diabetes and insulin use. This decision was made to assist in gaining greater insight into specific knowledge areas related to diabetes.

Cronbach coefficient alpha was used to calculate scale reliability. The coefficient alphas for the general test and the insulin use subscale have previously been established as adequate ($\alpha \geq .70$) (Fitzgerald et al., 1998). In the present study the reliability of this instrument was tested and was slightly stronger at $\alpha = .76$ comparing favourably with that obtained by the developers. To assess reliability of the four formed subscales Cronbach's alpha values were established. The Cronbach's alpha for the dietary related questions was, $\alpha = .309$, blood glucose testing, $\alpha = .376$ and

complications, $\alpha = .635$. These are considered low alpha values and removal of items within the different subscales would not have improved the alpha values, thereby caution must be exercised in the interpretation of results which relate to these subscales. However, the insulin subscale showed greater reliability with an alpha value of $\alpha = .70$.

A number of categorical variables were examined against the DKT results. Firstly, demographics of the PNs such as geographical location, as well as time spent working in this role was examined against knowledge scores. Characteristics of the practice setting that may facilitate PN involvement in diabetes care were also examined against knowledge scores; these include the use of a diabetes register and recall system, clinical auditing of diabetes care and the ability of PNs to refer patients for more specialised care. In addition, the relationship between DKT results and the PNs scope of practice in a diabetes education and monitoring role was also examined.

For the analysis of associations between categorical independent variables and DKT knowledge, the Kolmogorov-Smirnov statistic (with Lilliefors correction) was used to test the assumption of normality; where this was significant, indicating violation of the normality assumption, non-parametric tests were used instead of parametric. In all cases the DKT overall score and the subscale scores were shown to be significant ($\alpha < 0.05$), thus only non parametric tests are reported.

Overall Diabetes Knowledge Test Results

The overall mean score for the DKT was 17.48 ($SD \pm 3.28$) out of a possible score of 0 to 22. Table 4.2 displays the percentage of correct answers within the four subscales. There are four items classed as dietary related, which had an overall mean score of 3.08 ($SD \pm 0.92$) out of a possible score of 0 to 4. The lowest score occurred on the question, *"Which of the following is a free food"*, where 29% answered the question incorrectly. Five questions related to blood glucose monitoring, including patient self monitoring, laboratory testing and factors that affect blood glucose levels. These questions had an overall mean score of 3.89 ($SD \pm 1.07$) out of a possible score of 0 to 5. The lowest scoring item within the blood glucose monitoring subscale was associated with the question asking, *"Which should not be used to treat low blood glucose",* with only 63% ($n = 71$) of respondents choosing the correct answer. There were seven items under the subscale of complications of diabetes, covering the content area of both short and long term complications as well as sick day management. These questions were generally very well answered, with a mean score of 6.11 ($SD \pm 1.09$) out of a possible range of 0 to 7.

However, one question asking for a sign/symptom of diabetic ketoacidosis was poorly answered with only 48% ($n = 50$) of the respondents answering correctly. Six questions were analysed relating to insulin onset, action time, hypoglycaemia and hyperglycaemia and impact of exercise. The mean score was 4.41 ($SD \pm 1.54$), with a mean range of 49 to 96% correct. Under this subscale the item *"Which one of the following will most likely cause an insulin reaction",* sought to question the likely

effect of exercise on blood glucose level for someone taking insulin. This was the lowest scoring item in this subscale with only 49% ($n = 49$) of responses correct. Explanations for low scores will be examined further in the discussion chapter.

Table 4.2

Diabetes Knowledge Test Results

Items in subscales	Percent Correct (%)	*n* (118)
Dietary related		
Diabetes diet	96	111
Carbohydrate foods	83	94
Foods containing fat	75	86
Free foods	71	72
Blood glucose monitoring		
Method of testing blood glucose	94	109
Effect of fruit juice on blood glucose level	90	101
Effects of exercise	80	91
Glycosylated haemoglobin	77	87
Hypoglycaemia treatment	63	71
Complications and sick day management		
Infection	99	114
Foot care	99	115
Nerve disease	98	112
Sick day management	98	109
Heart disease	97	111
Effects of infection on blood glucose level	96	110
Ketoacidosis	48	50
Insulin related questions		
Hyperglycaemia	96	107
Hypoglycaemia causes	91	104
Insulin and food	91	101
Hypoglycaemia management	85	88
Insulin action times	70	71
Insulin and exercise	49	49

How well PNs performed on the DKT was examined in relation to the GP Division that they were affiliated with. The highest mean score on the DKT as displayed in Table 4.3, was obtained by the PNs in non metropolitan divisions of general practice; firstly the Kimberley division (M = 19.50, SD ± .70), followed by Great Southern (M = 19.40, SD ± 2.19). Fremantle division had the highest metropolitan DKT score (M = 19.08, SD ± 1.31).

Table 4.3
Diabetes Knowledge Test Score within Divisions of General Practice

Division	*M*	*n*
Kimberley	19.50	2
Great Southern	19.40	5
Fremantle	19.08	12
Bunbury	15.40	5
Mid West	17.50	2
Busselton/Mandurah	17.81	16
Canning	18.04	23
East Goldfields	18.00	3
Perth primary care	17.65	17
Pilbara	17.50	2
Rockingham/Kwinana	17.6	5
Osborne	15.6	25

Due to insufficient cases in each division no further statistical testing was viable. However, the divisions of general practice were regrouped under rural (n = 35) and metropolitan divisions (n = 82) to permit further analysis using a Mann-Whitney U test (Table 4.4). Results of this analysis showed that there was no significant difference in the DKT total or the 4 subscale scores between metropolitan and rural divisions of general practice.

Practice Nurse Experience and Diabetes Knowledge Test

Table 4.4 provides a summary of the DKT total and subscale scores against the metropolitan or rural location of the PN, as well as experience of the PN, with a higher mean rank indicating higher scoring within those groups. Further analysis was made to look for associations between the DKT total and subscale scores against the number of years worked as a PN, by regrouping into≥ 5years (*Mean Rank* = 58.73, *n* = 62) and <5 years (*Mean Rank* = 58.24, *n* = 54). A Mann-Whitney U test indicated there was no significant difference in DKT total scores between these two groups, U = 1660.00, z = -.078, p = .937, two tailed, nor in the DKT subscale scores between the two groups.

The number of years that the PNs were involved in providing diabetes related care in the general practice setting was likewise grouped in order to make comparisons of DKT total and subscale scores. As indicated earlier in this chapter almost half (47%, *n* = 54) of respondents had worked as a PN for less than five years and 52% (*n* = 54) had been involved in diabetes related care in the general practice setting for less than

five years. A Mann-Whitney U test indicated that the DKT total knowledge score of PNs with less than five years involvement in diabetes care had a higher mean rank (*Mean Rank* = 55.20, *n* = 54) than those having five or more years of experience (*Mean Rank* = 49.58, *n* = 50). This however was not significant, U = 1204.00, z = -.962, p = .336, two tailed.

Respondents were asked how many of their weekly working hours were spent in diabetes related work. In order to make comparisons of DKT scores these hours were regrouped into two or less hours and more than two hours. A Mann-Whitney U test indicated that the DKT score between those doing two or less hours (*Mean Rank* = 41.10, *n* = 43) and more than two hours (*Mean Rank* = 47.74, *n* = 45) was not significant in terms of the total DKT score, U = 821.500, z = - 1. 236, p = .216, two tailed. However, there was a statistically significant difference in the subscale score of blood glucose testing, with those spending more than two hours in diabetes related work (*Mean Rank* = 49.97, *n* = 45) scoring higher than those spending two or less hours (*Mean Rank* = 38.78, *n* = 43), U = 721.500, z = -2.162, p = .031, two-tailed.

Table 4.4

Diabetes Knowledge Test Scores and Practice Nurse Experience

	Mean Rank	Mean Rank	z	Asymp. Sig (2 tailed)
Divisions of General Practice	**Metropolitan** **n = 82**	**Rural** **n = 35**		
Overall DKT	55.70	66.74	-1.633	0.102
Dietary	56.60	64.61	-1.274	0.203
Blood glucose testing	56.89	63.94	-1.087	0.277
Complications	58.57	60.01	-0.234	0.815
Insulin	58.45	60.29	-0.276	0.783
Years worked as PN	**< 5 Years** **n = 54**	**>/= 5 Years** **n = 62**	**z**	**Asymp. Sig (2 tailed)**
Overall DKT	58.24	58.73	-0.780	0.937
Dietary	56.87	59.92	-0.532	0.595
Blood glucose testing	58.86	58.19	-0.114	0.909
Complications	57.56	59.31	-0.309	0.758
Insulin	59.38	57.73	-0.271	0.787
Years PN involved in diabetes care	**< 5 Years** **n = 54**	**>/= 5 Years** **n = 50**	**z**	**Asymp. Sig (2 tailed)**
Overall DKT	55.20	49.58	-0.962	0.336
Dietary	51.74	53.32	-0.291	0.771
Blood glucose testing	53.45	51.47	-0.353	0.724
Complications	53.95	50.93	-0.569	0.570
Insulin	56.06	48.69	-1.281	0.200
Weekly hours in diabetes care	**</= 2 Hours** **n = 43**	**> 2 Hours** **n = 45**	**z**	**Asymp. Sig (2 tailed)**
Overall DKT	41.10	47.74	-1.236	0.216
Dietary	40.48	48.34	-1.585	0.113
Blood glucose testing	38.78	49.97	-2.162	0.031*
Complications	47.10	42.01	-1.043	0.297
Insulin	44.55	44.46	-0.017	0.986

* $p < .05$, Mann- Whitney U test (2- tailed).

Practice Nurse Diabetes Related Continuing Education and Diabetes Knowledge Test

Educational preparedness was grouped into the two categories of completed and not completed diabetes related continuing education. A Mann-Whitney U test showed those respondents who had completed diabetes related continuing education had a higher mean rank for the total DKT (*Mean Rank* = 64.33, *n* = 39) than those who had not completed diabetes related continuing education (*Mean Rank* = 57.11, *n* = 79), however this result was not significant. Those who had completed diabetes related education also ranked higher in the subscales; dietary (*Mean Rank* = 61.47, *n* = 39), complications (*Mean Rank* = 63.94, *n* = 39) and insulin (*Mean Rank* = 60.86, *n* = 39).

General Practice Setting and Diabetes Knowledge Test

The role of the PN in terms of their involvement in clinical auditing, diabetes registers and recall systems was examined against DKT scores (Table 4.5). A higher mean rank indicates the group with a higher DKT score. A Mann-Whitney U test indicated there was a significant difference in DKT total knowledge scores for those PNs having undertaken a clinical audit of any aspects of diabetes care in the last twelve months (*Mean Rank* = 72.37, *n* = 19), *U* = 639.000, *z* = -2.082, *p* = .037, two-tailed. Also found to be statistically significant was the subscale complications (*Mean Rank* = 74.45, *n* = 19) with those PNs having been involved in a diabetes audit ranking higher than those who had not (*p* = .009).

Respondents were asked if their practice had a register of diabetes patients. Mann - Whitney U testing showed that although those with a register did have a higher mean rank in the DKT total score (*Mean Rank* = 58.39, *n* = 94) than those who did not (*Mean Rank* = 42.76, *n* = 17), the results of this were not found to be statistically significant.

Likewise, for those respondents whose practice has a register, the subscale scores of blood glucose testing (*Mean Rank* = 57.73, *n* = 94), complications (*Mean Rank* = 57.35, *n* = 94) and insulin (*Mean Rank* = 58.37, *n* = 94), ranked higher than those without a register, in the subscales of blood glucose testing (*Mean Rank* = 46.41, *n* = 17), complications (*Mean Rank* = 48.53, *n* = 17) and insulin (*Mean Rank* = 42.91, *n* = 17). The results of this were not found to be statistically significant. Likewise, having a role in operating a recall system for diabetes patients within the practice did not influence DKT scores compared to PNs not operating a recall system.

Table 4.5

Diabetes Knowledge Test Scores and Practice Setting

DKT	Mean Rank Yes	Mean Rank No	z	Asymp. Sig (2 tailed)
Clinical Audit	**n = 19**	**n = 96**		
Overall DKT	72.37	55.16	-2.082	0.037*
Dietary	60.82	57.44	-0.437	0.662
Blood glucose testing	65.08	56.60	-1.069	0.285
Complications	74.45	54.74	-2.606	0.009**
Insulin	66.37	56.34	-1.231	0.218
Diabetes register	**n = 94**	**n = 17**		
Overall DKT	58.39	42.76	-1.856	0.062
Dietary	54.74	62.97	-1.062	0.288
Blood glucose testing	57.73	46.41	-1.410	0.159
Complications	57.35	48.53	-1.156	0.248
Insulin	58.37	42.91	-1.879	0.060
Recall system	**n = 83**	**n = 28**		
Overall DKT	55.72	56.84	-0.162	0.872
Dietary	53.87	62.32	-1.306	0.192
Blood glucose testing	55.51	57.46	-0.293	0.769
Complications	56.96	53.14	-0.605	0.545
Insulin	56.03	55.91	-0.018	0.986

$* p < .05$, $** p < .01$, Mann- Whitney U test (2- tailed).

Practice Nurse Role in Diabetes Monitoring and Diabetes Knowledge Test

The role of the PN in monitoring patients with diabetes was examined in terms of specific clinical tasks. Mann -Whitney U testing showed that those who monitored blood pressure had a higher mean rank in the DKT total score (*Mean Rank* = 55.06, *n* = 84), and subscales of dietary (*Mean Rank* = 57.95, *n* = 84) and blood glucose (*Mean Rank* = 56.01, *n* = 84), against those who did not (*Mean Rank* = 54.80 *n* = 25), (*Mean Rank* = 45.10, *n* = 25), (*Mean Rank* = 51.60, *n* = 25) respectively; the results of this were not found to be statistically significant. Where respondents had a role in monitoring patients weight, Mann -Whitney U testing showed a higher mean rank in the dietary subscale (*Mean Rank* = 58.42, *n* = 89) against those who did not perform this role (*Mean Rank* = 46.20, *n* = 22) however, this was not significant. Where respondents had a role in foot care checks, Mann -Whitney U testing showed a higher mean rank in the blood glucose subscale (*Mean Rank* = 56.65, *n* = 66) against those who did not perform this role (*Mean Rank* = 48.30, *n* = 40) however, this was not significant. Where respondents had a role in monitoring blood glucose levels, Mann -Whitney U testing showed a higher mean rank in the dietary subscale (*Mean Rank* = 55.22, *n* = 90) against those who did not perform this role (*Mean Rank* = 47.56, *n* = 17) however, this was not significant.

For those respondents with a role in teaching patients when insulin therapy is first initiated, Mann -Whitney U testing showed a higher mean rank in the dietary subscale (*Mean Rank* = 60.78, *n* = 23) against those who do not have this role (*Mean Rank* = 55.39, *n* = 89) . Further to this, those respondents with a role in advising patients on

how to adjust this medication based on home monitored blood glucose levels, showed a higher mean rank in the DKT total (*Mean Rank* = 66.45, *n* = 10) against those who do not have this role (*Mean Rank* = 56.08, *n* = 103). So too, in the subscales of blood glucose (*Mean Rank* = 68.30, *n* = 10) and insulin (*Mean Rank* = 61.85, *n* = 10), respondents had a higher mean rank, against those not performing this role in the blood glucose (*Mean Rank* = 55.90, *n* = 103) and insulin subscales (*Mean Rank* = 56.53, *n* = 103). These results were not significant. For those respondents with a role in advising insulin adjustment based on their own clinical judgement, results were not significant. However, mean rank was higher in the total DKT for those respondents with this role (*Mean Rank* = 73.36, *n* = 7) against those without this role (*Mean Rank* = 55.38, *n* = 105). Again, whilst not significant, those respondents with this role had a higher mean rank in the blood glucose (*Mean Rank* = 72.21, *n* = 7) and insulin subscales (*Mean Rank* = 63.00, *n* = 7). This was compared to those respondents who did not have this role, with a lower mean rank in the blood glucose (*Mean Rank* = 55.45, *n* = 105) and insulin subscales (*Mean Rank* = 56.07, *n* = 105).

Practice Nurse Role in Diabetes Self Management Education and Diabetes Knowledge Test

Table 4.6 highlights areas of diabetes education provided to patients with type 2 diabetes by PNs. Where the provision of self monitoring of type 2 diabetes was considered, results for the DKT insulin subscale were statistically significant, $U = 817.500$, $z = -2.100$, $p = .036$, two-tailed, with those providing this education having a higher score (*Mean Rank* = 56.74, *n* = 76) compared to those not providing this

education (*Mean Rank* = 43.19, *n* = 29). For those respondents providing healthy eating advice to patients, there was statistical significance for the DKT total score (*U* = 492.000, *z* = -2.189, *p* = .029, two-tailed) as well as the dietary subscale (*U* = 407.000, *z* = -3.134, *p* = .002, two-tailed); whereby those respondents who provide this education had a higher DKT total score (*Mean Rank* = 57.71, *n* = 93) against those who do not (*Mean Rank* = 39.25, *n* = 16), as well as higher scoring in the dietary subscale (*Mean Rank* = 58.62, *n* = 93) against those not providing this education (*Mean Rank* = 33.94, *n* = 16). In terms of providing exercise advice, the dietary subscale score again proved significant (*U* = 521.000, *z* = -2.358, *p* = .018, two-tailed), whereby those providing this education scored higher (*Mean Rank* = 55.44, *n* = 86) than those not providing exercise advice (*Mean Rank* = 38.44, *n* = 18). There was no statistically significant difference in the DKT or subscales, between those respondents providing stop smoking advice, weight reduction advice and sick day management and those not providing this education role.

Respondents were also asked if they assessed patients' diabetes related educational needs, with statistical significance shown in the total DKT scores (*U* = 950.500, *z* = -1.995, *p* = .010, two-tailed) as well as the subscale of blood glucose (U = 880.500, *z* = -2.568, *p* = .010, two-tailed) which included the issues of home monitoring of blood glucose levels, management of hypoglycaemia and effects of diet and exercise on blood glucose levels. Those respondents performing this role scored higher on the total DKT (*Mean Rank* = 56.82, *n* = 67) compared to those not providing this assessment role (*Mean Rank* = 44.68, *n* = 37), likewise higher scoring occurred in the

blood glucose subscale for those with this role (*Mean Rank = 57.86, n = 67*) compared to those not providing this assessment role (*Mean Rank = 42.80, n = 37*).

Table 4.6

Practice Nurse Role in Type 2 Diabetes Education against Diabetes Knowledge Test Scores

Education provided to patients by PNs:	Mean Rank Yes	Mean Rank No	z	Asymp. Sig (2 tailed)
Self Monitoring of type 2 diabetes	**n = 76**	**n = 29**		
Overall DKT	56.36	44.21	-1.852	0.064
Dietary	54.95	47.88	-1.158	0.247
Blood glucose testing	54.52	49.02	-0.874	0.382
Complications	53.16	52.57	-0.099	0.921
Insulin	56.74	43.19	-2.100	0.036*
Healthy eating	**n = 93**	**n = 16**		
Overall DKT	57.71	39.25	-2.189	0.029*
Dietary	58.62	33.94	-3.134	0.002**
Blood glucose testing	56.91	43.91	-1.604	0.109
Complications	54.27	59.25	-0.654	0.513
Insulin	56.59	45.78	-1.305	0.192
Exercise advice	**n = 86**	**n = 18**		
Overall DKT	54.77	41.64	-1.706	0.088
Dietary	55.44	38.44	-2.358	0.018*
Blood glucose testing	54.27	44.06	-1.381	0.167
Complications	51.69	56.36	-0.675	0.500
Insulin	53.90	45.83	-1.065	0.287
Stop smoking advice	**n = 83**	**n = 21**		
Overall DKT	54.55	44.38	-1.402	0.161
Dietary	54.79	43.45	-1.673	0.094
Blood glucose testing	53.40	48.95	-0.638	0.524
Complications	51.95	54.67	-0.414	0.679
Insulin	54.66	43.98	-1.499	0.134

Education provided to patients by PNs:	Mean Rank Yes	Mean Rank No	z	Asymp. Sig (2 tailed)
Weight reduction	**n = 83**	**n = 20**		
Overall DKT	54.16	43.05	-1.516	0.130
Dietary	54.34	42.30	-1.763	0.078
Blood glucose testing	52.80	48.68	-0.587	0.557
Complications	51.31	54.85	-0.534	0.594
Insulin	54.30	42.48	-1.643	0.100
Sick day management	**n = 54**	**n = 43**		
Overall DKT	47.54	50.84	-0.583	0.560
Dietary	49.44	48.44	-0.190	0.849
Blood glucose testing	47.11	51.37	-0.784	0.433
Complications	49.38	48.52	-0.167	0.868
Insulin	46.70	51.88	-0.930	0.352
Assess patients diabetes related educational needs	**n = 67**	**n = 37**		
Overall DKT	56.82	44.68	-1.995	0.046*
Dietary	55.57	46.93	-1.518	0.129
Blood glucose testing	57.86	42.80	-2.568	0.010*
Complications	49.99	57.04	-1.279	0.201
Insulin	55.44	47.18	-1.382	0.167

* $p < .05$ **, $p < .01$, Mann-Whitney U test (2- tailed)

BARRIERS AND FACILITATORS TO PROVISION OF DIABETES CARE BY PRACTICE NURSES

The third objective of the present study was to identify restraining and driving factors that influence the provision of diabetes care by PNs. These factors were primarily assessed by a questionnaire developed by Honan et al. (1988) to examine nurses' attitudes surrounding patient education issues. Open ended questions also provided respondents with the opportunity to express other factors that they consider restrict or

assist them in the provision of diabetes self management education. Data analysis examined firstly barriers and facilitators and secondly the associations between the categorical independent variables, identified previously in the DKT analysis. These were investigated against the dependent variable of PN attitude scores. Independent variables include; PN experience, diabetes related continuing education, the general practice setting, which includes the use of diabetes register and recall systems, and the role of the PN.

Prior to analyses, the reliability of the instrument was determined. Cronbach coefficient alpha was used to calculate scale reliability for the total 14 items (α = .640) and was found to be slightly less than adequate. A comparison is unable to be made as previous studies did not report an alpha value. A Cronbach's alpha coefficient of .70 or higher is considered to be acceptable (University of California Los Angeles, n.d.). For the purpose of analysis, responses are grouped under four different subscales: PN's attitudes and beliefs, educational preparedness of the PN, resources including time and setting, and lastly documentation. The first subscale, consisting of six items, looked at PN attitude and beliefs in the area of patient teaching. Of the four subscales this had the highest Cronbach alpha value of .731, which is acceptable. Two items sought to find how highly PNs rate the importance of educational opportunities to provide the knowledge they need to teach their patients, this had a low Cronbach alpha value of .525.

There were 3 items comprising the subscale examining resources for PNs to carry out patient education which had a fairly minimal Cronbach alpha value of .207. Lastly, the subscale of documentation had a low Cronbach alpha value of .658. Within all of

the subscales, the Cronbach alpha would not have improved with removal of any items.

The questionnaire comprises 14 questions, using a 5- point Likert scale, where 'Strongly Disagree' = 1, 'Disagree' = 2, 'Undecided' = 3, 'Agree' = 4 and 'Strongly Agree' = 5. Questions 57, 58, 59, 60 and 61 had reversed scoring. The overall mean score for the scale was 3.59 ($SD \pm .384$). Higher scores indicate greater agreement with the item. The results of the descriptive statistics are reported on first. Following this, inferential statistics are presented. The Kolmogorov-Smirnov statistic (with Lilliefors correction) was used to test the assumption of normality; in this case it was greater than .05 therefore normality was assumed.

Normality of the distribution for the mean score of factors influencing patient education was also confirmed through visual inspection of the histogram. Figure 4.5 displays the symmetry in the shape of a histogram and given the normality of distribution was assumed, parametric testing (t-tests) is reported on.
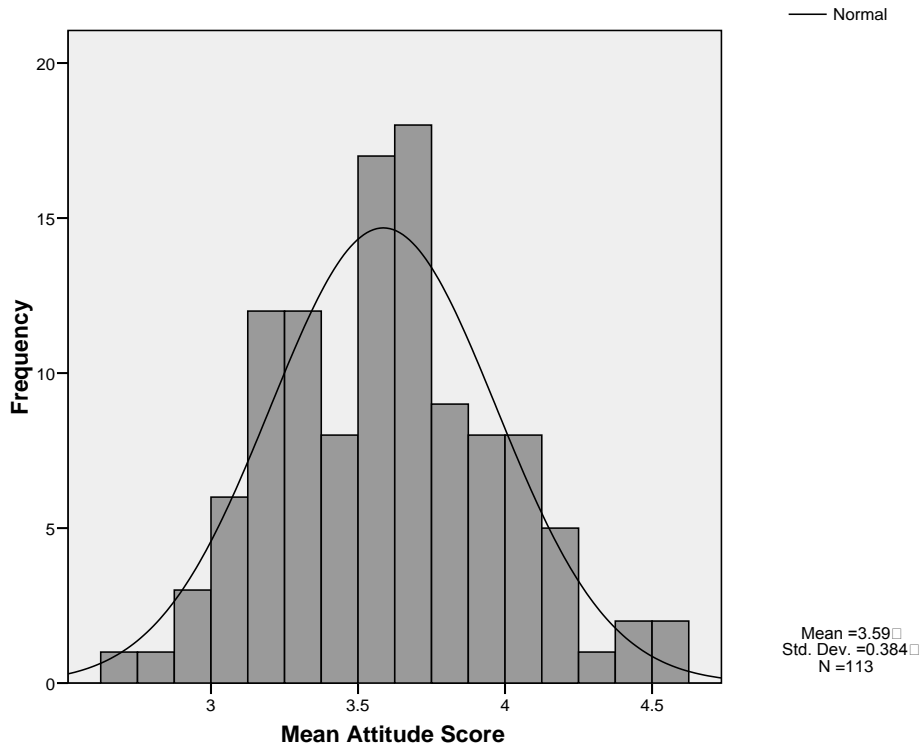
Figure 4.5. **Mean score practice nurse attitude to factors influencing patient education.**

Practice Nurse Attitude to Patient Education

The mean values for each of the subscales are shown in Table 4.7. The highest mean scores occurred within the subscales looking at the PNs desire for further knowledge, followed by the PNs attitude to patient education, showing a more positive or higher level of agreement within these items. The lowest mean score occurred within the subscale of documentation; this displayed a wider variation in responses. Each subscale will be discussed next.

Table 4.7

Mean Score Practice Nurse Attitude to Patient Education

Item	M	SD
PN attitude total	3.59	.384
PN attitude and beliefs	3.95	.518
Educational preparation	4.23	.545
Time/resources	3.06	.636
Documentation	2.96	.892

The results of the following analysis are presented in Table 4.8. The mean score, for the subscale looking at PNs attitudes and beliefs with regards to their role in patient teaching, was 3.95 ($SD \pm .518$) indicating respondents generally placed a high level of importance on their role in teaching their patients about diabetes. Of the six items, three had a higher mean score: "*Patient teaching is a high priority in my nursing care*", "*Patient teaching is an important part of nursing practice for me*" and "*Patient teaching should be an important part of every nurse's responsibility*". However, two items had a large percentage of respondents who were undecided in some attitudes: "*The nurse should assume responsibility for coordinating patient teaching*" of which 32% ($n = 38$) were undecided. Of the statement "My *patients are being adequately taught*" 19% ($n = 23$) disagreed and 31% ($n = 37$) were undecided.

Two items sought to find how highly PNs rated the importance of educational opportunities to provide the knowledge they need to teach their patients. For this subscale the mean score was 4.23 ($SD \pm .545$). Eighty seven percent ($n = 103$) agreed or strongly agreed with a need for workshops providing specific knowledge enabling

PNs to teach patients and 86% (n = 102) agreed with the necessity for in-services that review teaching and learning techniques.

There were three items comprising the subscale examining resources for PNs to carry out patient education. The need for time and space to teach as well as have access to teaching materials was generally considered to be of some importance (M = 3.06, SD ± .636). Having one central area for patient teaching materials was considered helpful for 85% (n = 100) of PNs. Of the statement *"lack of a private area to do patient teaching hampers patient teaching"* 60% (n = 71) agreed or strongly agreed. Time was identified as another barrier as over half of respondents (58%, n = 69) disagreed or strongly disagreed with the item "*There is adequate time to do patient teaching*".

Lastly the issue of documentation was explored with three items making up this subscale. The mean score was 2.96 (SD ± .892). A large proportion of respondents (70%, n = 79) indicated that they do not always document informal patient teaching. However, formal patient teaching was far more likely to be documented, with 67% (n = 74) disagreeing with the statement *"I often do formal patient teaching that I do not document"*. Responses were divided with the statement *"Lack of time is a factor why documentation of patient teaching is not done"*.

Table 4.8

Factors Influencing Practice Nurse Involvement in Patient Education.

In general, I believe that:	strongly disagree	disagree	undecided	agree	strongly agree	missing data
PN attitude and beliefs (%)						
Patient teaching is a high priority in my nursing care	1 (n = 1)	6 (n = 7)	6 (n = 7)	42 (n = 50)	40 (n = 47)	5 (n = 6)
The nurse should assume responsibility for coordinating patient teaching	2 (n = 2)	13 (n = 15)	32 (n = 38)	38 (n = 45)	9 (n = 11)	6 (n = 7)
Patient teaching should be an important part of every nurses responsibility		1 (n = 1)	2 (n = 2)	58 (n = 68)	35 (n = 41)	5 (n = 6)
Other disciplines need to be more involved in patient teaching	1 (n = 1)	2 (n = 2)	8 (n = 9)	58 (n = 69)	25 (n = 30)	6 (n = 7)
Patient teaching is an important part of nursing practice for me.		3 (n = 4)	2 (n = 3)	49 (n = 58)	40 (n = 47)	5 (n = 6)
My patients are being adequately taught.	2 (n = 2)	19 (n = 23)	31 (n = 37)	32 (n = 38)	9 (n = 11)	6 (n = 7)
Educational preparation of nurse (%)						
Patient teaching could be improved if there were workshops on specific knowledge needed to teach patients	1 (n = 1)	1 (n = 1)	6 (n = 7)	56 (n = 66)	31 (n = 37)	5 (n = 6)
There should be in-services that review the teaching and learning techniques		1 (n = 1)	8 (n = 9)	55 (n = 65)	31 (n = 37)	5 (n = 6)

In general, I believe that:	strongly disagree	disagree	undecided	agree	strongly agree	missing data
Time/Resources (%)						
It would be helpful if patient teaching materials were kept in one central area.		3 ($n = 4$)	7 ($n = 8$)	57 ($n = 67$)	28 ($n = 33$)	5 ($n = 6$)
There is adequate time to do patient teaching.	17 ($n = 20$)	41 ($n = 49$)	14 ($n = 16$)	19 ($n = 22$)	5 ($n = 6$)	4 ($n = 5$)
Lack of a private area to do patient teaching hampers patient teaching	4 ($n = 5$)	25 ($n = 29$)	7 ($n = 8$)	41 ($n = 48$)	19 ($n = 23$)	4 ($n = 5$)
Documentation (%)						
I often do informal patient teaching that I do not document.	7 ($n = 8$)	19 ($n = 22$)	3 ($n = 4$)	56 ($n = 63$)	14 ($n = 16$)	4 ($n = 5$)
I often do formal patient teaching that I do not document	14 ($n = 16$)	53 ($n = 58$)	8 ($n = 9$)	22 ($n = 24$)	3 ($n = 3$)	
Lack of time is a factor why documentation of patient teaching is not done.	7 ($n = 8$)	32 ($n = 36$)	17 ($n = 19$)	28 ($n = 31$)	16 ($n = 18$)	5 ($n = 6$)

General Practice Division and Practice Nurse Attitude to Patient Education

The divisions of general practice were regrouped under rural ($n = 33$) and metropolitan divisions ($n = 79$) to permit further analysis. Whilst not significant, Table 4.9 illustrates that those in a rural division ($n = 33$) had a higher mean patient education score in total ($M = 3.64$, $SD \pm .372$) than those in a metropolitan division ($n = 78$). Likewise within all of the subscales, rural divisions had a higher mean score.

Practice Nurse Experience and Attitude to Patient Education

Table 4.9 provides a summary of PN attitude to patient education total and subscale scores against the experience of the PN, with higher mean scores indicating greater agreement overall with the item. The number of years of experience as a PN were grouped into≥ 5years (*n* = 58) and <5 years (*n* = 53). Those working less than five years showed a higher total mean score (*M* = 3.58, *SD* ± .389), as well as in the subscales of educational preparation (*M* = 4.27, *SD* ± .528), time/resources (*M* = 3.08, *SD* ± .657) and documentation (*M* = 2.99, *SD* ± .851) compared to those having worked greater than five years, (*M* = 3.57, *SD* ± ..365), (*M* = 4.19, *SD* ± .568), (*M* = 2.99, *SD* ± .574), (*M* = 2.92, *SD* ± .901) respectively. The *t* test was non-significant for years providing diabetes related care in the general practice setting when regrouped into ≥ 5years (*n* = 47) and <5 years (*n* = 53). Those PNs working less than five years had higher mean scores in each area, apart from the PN attitude subscale.

An independent samples *t* test was significant when attitude scores were compared against number of hours per week spent in diabetes related work, regrouped into </= 2 hours (*n* = 43) and > 2 hours (*n* = 41). Table 4.9 shows a significantly higher mean score or level of agreement, in total score (*M* = 3.71, *SD* ± .421), *t* (82) = -2.290, *p* = .025, two-tailed) and the subscales of PN attitude (*M* = 4.11 , *SD* ± .477), *t* (82) = -2.390, *p* = .019, two-tailed) and time/resources (*M* = 3.28, *SD* ± .654), *t* (82) = -2.643, *p* = .010, two-tailed), as factors influencing patient education, for PNs spending > 2 hours per week in diabetes related work.

The *t* test was statistically significant, where respondents who had completed diabetes related continuing education (*n* = 36) displayed a higher total mean patient education score (*M* = 3.70, *SD* ± .380), than those who had not (*n* = 77) (*M* = 3.53, *SD* ± .375), *t* (111) = 2.283, *p* = .024, two-tailed). In this instance, a higher score shows greater agreement with the items. Further to this, respondents who had completed diabetes related continuing education showed a higher mean score in all of the patient education subgroups; however this was not statistically significant (Table 4.9).

Table 4.9
Attitude Scores and Practice Nurse Experience

Attitude Score	M (SD)	M (SD)	*t*	*P*
Divisions of General Practice	**Metropolitan**	**Rural**		
Patient education total	3.56 (.391) n = 79	3.64 (.372) n = 33	-.976	.331
PN attitude	3.94 (.509) n = 78	3.98 (.552) n = 33	-.416	.678
Educational preparation of PN	4.21 (.555) n = 78	4.27 (.532) n = 33	-.537	.592
Time/Resources	3.00 (.657) n = 79	3.17 (.584) n = 33	-1.269	.207
Documentation	2.95 (.912) n = 79	3.01 (.868) n = 33	-.326	.745
Years worked as PN	**< 5 Years**	**>/= 5 Years**		
Patient education total	3.58 (.389) n = 53	3.57 (.365) n = 58	.145	.885
PN attitude	3.92 (.595) n = 52	3.98 (.450) n = 58	-.656	.514
Educational preparation of PN	4.27 (.528) n = 52	4.19 (.568) n = 58	.758	.450
Time/Resources	3.08 (.657) n = 53	2.99 (.574) n = 58	.749	.445
Documentation	2.99 (.851) n = 53	2.92 (.901) n = 58	.445	.657

Attitude Score	M (SD)	M (SD)	t	P
Years PN involved in diabetes care	**< 5 Years** **n = 53**	**>/= 5 Years** **n = 47**		
Patient education total	3.59 (.404)	3.58 (.352)	.141	.888
PN attitude	3.90 (.621)	4.03 (.385)	-1.240	.218
Educational preparation of PN	4.26 (.515)	4.17 (.574)	.863	.390
Time/Resources	3.11 (.679)	3.00 (.594)	.833	.407
Documentation	2.98 (.920)	2.85 (.884)	.717	.475
Weekly hours in diabetes care	**</= 2 Hours** **n = 43**	**> 2 Hours** **n = 41**		
Patient education total	3.51 (.371)	3.71 (.421)	-2.290	.025*
PN attitude	3.84 (.565)	4.11 (.477)	-2.390	.019*
Educational preparation of PN	4.21 (.590)	4.23 (.476)	-.191	.849
Time/Resources	2.91 (.600)	3.28 (.654)	-2.643	.010*
Documentation	2.97 (.766)	2.98 (1.14)	-.088	.930
PN continuing education	**Yes**	**No**		
Patient education total	3.70 (.380) n = 36	3.53 (.375) n = 77	2.283	.024*
PN attitude	4.07 (.455) n = 36	3.85 (.538) n = 76	1.732	.086
Educational preparation of PN	4.30 (.451) n = 36	4.19 (.582) n = 76	1.042	.300
Time/Resources	3.08 (.687) n = 36	3.04 (.614) n = 77	.311	.757
Documentation	3.18 (1.06) n = 36	2.86 (.785) n = 77	1.816	.072

* $p < .05$, Levene's test for Equality of Variances >0.05.

General Practice Setting and Attitude to Patient Education

Table 4.10 illustrates PN attitude scores overall and within the subgroups, in terms of whether or not they have a role in a diabetes register and recall system, as well as their involvement in clinical auditing related to diabetes. Higher mean scores indicate higher agreement within those items. Those PNs whose practice had a register of patients with diabetes (n = 90), showed a higher mean total attitude score (M = 3.62, $SD \pm$ .337) compared to those who did not (n = 16) (M = 3.49, $SD \pm$ .423), however this was not significant. In the subscales of PN attitude, time/resources and documentation, those with a register again had higher mean scores. Practice nurse involvement in a patient recall system was not shown to be significant, however those with this role (n = 79) had a higher mean total attitude score as well as in the subscales educational preparation, time/resources and documentation as compared to those who did not (n = 27), as listed in table 4.10.

For those PNs having been involved in a diabetes clinical audit (n = 18), an independent samples t test was significant (t (108) = 2.121, p = .036, two-tailed) showing a higher mean attitude score (M = 3.76, $SD \pm$ .450) compared to those who indicated they had not been involved in a diabetes clinical audit (n = 92) (M = 3.55, $SD \pm$ .366).

Table 4.10

Attitude Scores and General Practice Setting

Attitude Score	M (SD)	M (SD)	t	P
Diabetes register	**Yes** **n = 90**	**No** **n = 16**		
Patient education total	3.62 (.377)	3.49 (.423)	1.270	.207
PN attitude	3.97 (.507)	3.96 (.583)	.074	.941
Educational preparation of PN	4.20 (.524)	4.41 (.491)	-1.465	.146
Time/Resources	3.13 (.627)	2.83 (.699)	1.690	.094
Documentation	3.03 (.910)	2.55 (.879)	1.936	.056
Recall system	**Yes** **n = 79**	**No** **n = 27**		
Patient education total	3.61 (.388)	3.55 (.390)	.605	.546
PN attitude	3.94 (.493)	3.99 (.588)	-.372	.711
Educational preparation of PN	4.24 (.530)	4.22 (.577)	.151	.880
Time/Resources	3.08 (.650)	3.04 (.656)	.326	.745
Documentation	3.02 (.946)	2.77 (.805)	1.256	.212
Clinical audit	**Yes**	**No**		
Patient education total	3.76 (.450) n =18	3.55 (.366) n = 92	2.121	.036*
PN attitude	4.14 (.363) n = 18	3.91 (.542) n = 92	1.700	.092
Educational preparation of PN	4.19 (.546) n = 18	4.23 (.549) n = 91	-.257	.798
Time/Resources	3.33 (.936) n = 18	3.00 (.560) n = 92	2.017	.046
Documentation	3.13 (.937) n = 18	2.93 (.886) n = 92	.877	.383

* $p < .05$, Levene's test for Equality of Variances >0.05.

Practice Nurse Role in Diabetes Self management Education and Monitoring

Table 4.11 illustrates various roles of the PN in diabetes self management education and monitoring, where those involved, showed a higher mean attitude score, indicating higher level of agreement within those items, compared to those who do not have a role in that area. All of the items that were found to be significant are listed in table 4.11.

Practice nurses with a role in foot assessment, showed significantly higher agreement overall, with the scale assessing their attitude to patient education (t (63) = 2.276, p = .025, two-tailed) and the subscales of PN attitude (t (63) = 2.583, p = .011, two-tailed) and time/resources (t (63) = 2.386, p = .019, two-tailed), as factors influencing their role in this area. Mean scores for PNs with a role in insulin initiation (n = 23) were significantly higher in the patient education total score (M = 3.76, SD ± .389) (t (106) = 2.684, p = .008, two-tailed), compared to those without this role (n = 85) (M = 3.53, SD ± .365). Practice nurses with a role in teaching patients the principles of insulin therapy and adjusting insulin doses, showed a significantly higher level of agreement in terms of influencing factors, within the items of time/resources and space allowing them to perform this role, compared to those who did not perform these roles (Table 4.11).

Time/resources and space where again factors that were considered influential for those PNs with a role in sick day education (n = 52) (M = 3.26, SD ± .675) (t (92) = 3.168, p = .002, two-tailed) compared to those who did not perform this role (n = 42) (M = 2.86, SD ± .511). Those PNs who had a role in assessing patients diabetes

related educational needs, also showed a significantly higher level of agreement within the subscale of time/resources and space ($n = 64$) ($M = 3.20$, $SD \pm .639$) (t (99) $= 3.209$, $p = .002$, two-tailed), compared to those who did not perform this role ($n = 37$) ($M = 2.80$, $SD \pm .518$).

Table 4.11

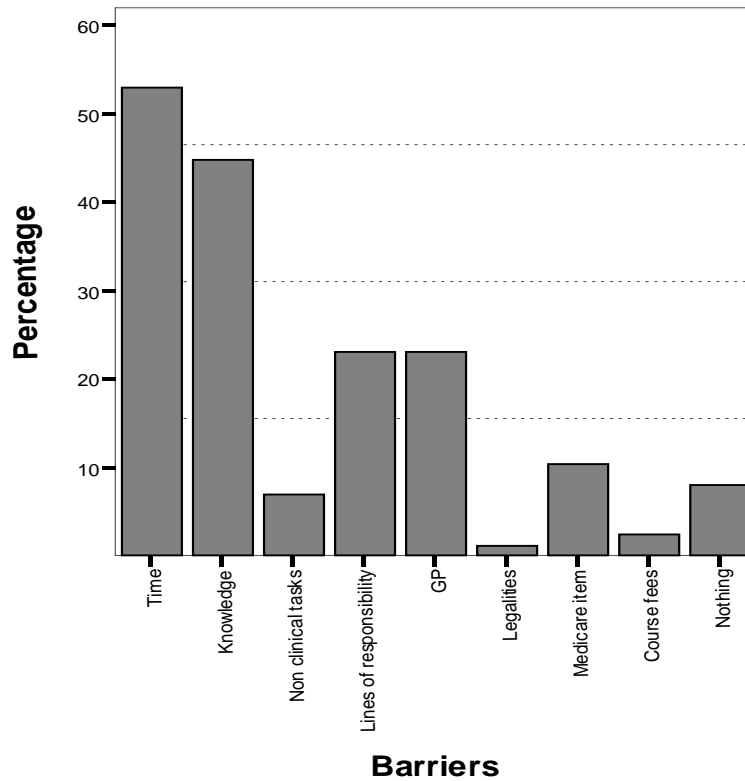*Practice Nurse Role in Type 2 Diabetes Education and Monitoring Against Attitude Scores*

PN role in patient education	M (SD)	M (SD)	t	P
Foot care checks:	**Yes**	**No**		
Patient education total	3.66 (0.376) n = 63	3.49 (0.364) n = 40	2.276	.025*
PN attitude	4.06 (0.441) n = 63	3.79 (0.577) n = 40	2.583	.011*
Time/resources	3.16 (0.655) n = 63	2.87 (0.549) n = 40	2.386	.019*
Insulin initiation:	**Yes**	**No**		
Patient education total	3.76 (0.389) n = 23	3.53 (0.365) n = 85	2.684	.008**
Time/resources	3.32 (0.700) n = 23	2.96 (0.577) n = 85	2.491	.014*
Insulin adjustment based on blood glucose level:	**Yes**	**No**		
Time/resources	3.63 (0.637) n = 10	2.98 (.586) n = 99	3.319	.001**
Insulin adjustment based on PN clinical judgement:	**Yes**	**No**		
Time/resources	3.52 (0.716) n = 7	3.00 (.599) n = 101	2.196	.030*
Self monitoring of type 2 diabetes:	**Yes**	**No**		
Patient education total	3.64 (0.377) n = 73	3.43 (0.389) n = 28	2.472	.015*
PN attitude	4.04 (0.453) n = 73	3.68 (0.634) n = 27	3.184	.002**
Exercise advice:	**Yes**	**No**		
PN attitude	4.00 (0.464) n = 83	3.69 (.717) n = 17	2.322	.022*
Stop smoke advice:	**Yes**	**No**		
PN attitude	4.01 (0.452) n = 80	3.73 (.681) n = 20	2.209	.030*

PN role in patient education	M (SD)	M (SD)	t	P
Sick day education:	**Yes**	**No**		
Patient education total	3.73 (0.372) n = 52	3.41 (0.343) n = 42	4.237	.000**
PN attitude	4.08 (0.432) n = 52	3.79 (0.585) n = 41	2.701	.008**
Time/ resources	3.26 (0.675) n = 52	2.86 (0.511) n = 42	3.168	.002**
Documentation	3.13 (0.959) n = 52	2.68 (0.845) n = 42	2.394	.019*
Assess educational needs:	**Yes**	**No**		
Patient education total	3.64 (0.382) n = 64	3.47 (0.366) n = 37	2.110	.037*
PN attitude	4.03 (.429) n = 64	3.78 (.621) n = 36	2.331	.022*
Time/resources	3.20 (0.639) n = 64	2.80 (0.518) n = 37	3.209	.002**

* $p < .05$, ** $p < .01$, Levene's test for Equality of Variances >0.05.

Barriers to Provision of Diabetes Self Management Education and Monitoring.

Practice nurses were further invited, through two open ended questions, to list any other factors that they considered restricted them in providing diabetes self management education. Responses were firstly grouped around similar themes. From this, groups of responses were categorised and are presented in Figure 4.6. Time was the biggest restriction identified by 53% of the respondents ($n = 46$), followed by knowledge (45%, $n = 39$), GPs (23%, $n = 20$) and lines of responsibility (23%, $n = 20$). Further to this, when asked what one thing they would change in order to improve the care they provided to people with type 2 diabetes 25% ($n = 30$) of PNs suggested the setup of their practice could be changed to improve the care they were able to provide, 20% ($n = 24$) identified their own level of knowledge and a further 20% ($n = 23$) identified available time as something they would like to change.
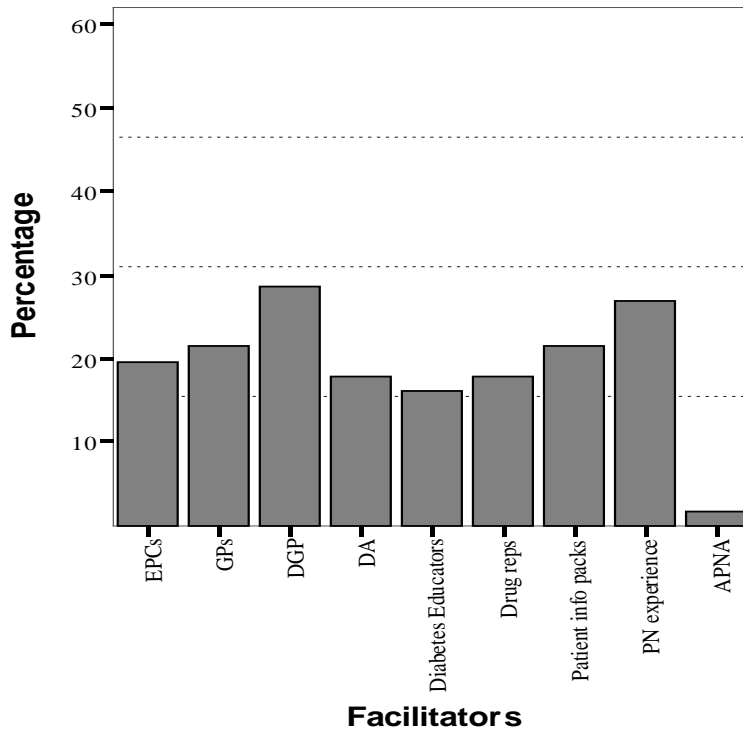
Figure 4.6. **Barriers to practice nurse role.**

Facilitators to Provision of Diabetes Self Management Education and Monitoring.

Factors that PNs considered assisted them in providing diabetes self management education, were similarly grouped around common themes and are presented in Figure 4.7. The Divisions of General Practice (29%, $n = 16$) and the PNs own level of experience (27%, $n = 15$) were listed by respondents as the two leading factors. When asked what was the one best thing about the care they currently provided to people with type 2 diabetes, 42% ($n = 50$) identified their patient liaison role, followed by

diabetes self management education (30.5%, $n = 36$), holistic care (16%, $n = 19$), GP

liaison role (6%, $n = 7$), wound care (3%, $n = 4$) and foot care (3%, $n = 4$).

Figure 4.7. **Facilitators to practice nurse role.**

This chapter has reported all of the findings from the analysis of the survey responses.

The following chapter is a final discussion and summation of these results,

comparative to the purpose and objectives of this study. The limitations identified,

together with recommendations arising, will be detailed.

CHAPTER 5

DISCUSSION

This study explored the diversity and capacity of Western Australian PNs in contributing towards self management education for people with diabetes within the general practice setting. The need for this study was identified by the paucity of literature to date that describes the current involvement of PNs in diabetes self management education, together with their educational preparedness in this area. Data collection included PNs perceptions of the driving and restraining factors influencing their involvement in this growing area of chronic disease management.

This final chapter discusses the findings from the current study, with regard to the study's objectives and with reference to literature as well as guidelines that now exist for the role of the Australian PN in diabetes care in the general practice setting. The PN population in WA is described prior to the main discussion. In particular, findings are explored in light of current and future demands for the role of the PN in diabetes self management education and care. Furthermore, the forces driving change in diabetes care within the primary health care setting, together with models of health care delivery are reviewed with reference to the current study. The strengths and limitations of this study are also considered. Finally, recommendations of the study will be detailed.

Practice nurses are geographically distributed throughout the state of Western Australia therefore the methodology approach selected for the study was a descriptive,

cross-sectional study using a mail out to disseminate self-completion questionnaires. A total of 758 surveys were posted out to PNs in urban and rural areas across WA. The final response rate was 16% with 118 surveys returned.

The study was conceptualised to explore three objectives:

1. Describe the existing roles, responsibilities and competencies of practice nurses in diabetes self management education.

2. Determine the educational preparedness of practice nurses in diabetes related knowledge and skills.

3. Identify driving and restraining factors that influence the provision of diabetes care by practice nurses.

WESTERN AUSTRALIAN PRACTICE NURSE POPULATION

The population of PNs in WA has increased considerably since this study was first commenced. This is demonstrated by the results of the most recent National Practice Nurse Workforce Survey conducted in 2007 which showed there were approximately 895 PNs in WA, with almost 72% of WA general practices employing a nurse (Porritt, 2007a). At the time of data collection, between October 2006 and January 2007 the population of PNs working in general practice within WA was considered to be approximately 700. This increase in numbers coincides with changes to Medicare, which is now supportive of a role for the PN to provide patient care in defined areas including chronic disease management.

Recruitment for the present study occurred via the 13 WA Divisions of General Practice with valuable assistance through the Western Australian General Practice Network. The number of surveys ultimately supplied to each division for distribution to their members was determined by need, according to each divisional project officer with knowledge of their PN population and access to a database. However, not all PNs detailed their General Practice Division affiliation, so response rates could be somewhat higher. Eighty eight percent of respondents indicated which Division of General Practice their practice was affiliated with. The only divisional area not represented was the Central Wheatbelt, with no surveys returned. At the time of distribution, the population of PNs in this region was small, totalling 15. Likewise for the Kimberley and Mid West, the PN population was also 15 for each area. Only 2 surveys were returned from each of these areas.

From the information provided it was determined that 70% ($n = 82$) of respondents were from the Perth metropolitan area and 30% ($n = 35$) from a non-metropolitan region. Participants in the current study were registered nurses (72%), registered midwives (14%) and enrolled nurses (11%). The proportion of registered nurses to enrolled nurses is relatively equivalent to that found in the 2007 Australian PN survey showing a greater number of registered (79%) than enrolled nurses (15%) working in the general practice setting in WA (Porritt, 2007a). Pascoe et al. (2005) similarly found, of those PNs who responded to a national survey, 85% were registered nurses and 15% were enrolled nurses.

Almost half (47%) of the study participants had worked as a PN less than five years which supports what is known about the increase in recent years of numbers of nurses

choosing to work in general practice. The 2007 National Workforce study of Australian PNs showed that 40% had two to five years experience, with the majority (60%) having between two and ten years experience in this role (Porritt, 2007a). With regards to employment status, the current study found 84% of respondents worked less than 35 hours per week. Other Australian studies have found PNs to be predominantly a part time workforce (Pascoe et al., 2005; Watts et al., 2004). Similarly in 2007, the National Workforce study of PNs indicated 75.5% of PNs worked less than 35 hours per week; however this same study displayed a trend towards PNs increasingly being employed fulltime in this position (Porritt, 2007a). The PN population for the current study is representative based on these studies.

THE ROLE OF THE WESTERN AUSTRALIAN PRACTICE NURSE

Practice nurses in Western Australia must increasingly have a fundamental role in facilitating and contributing to, a multidisciplinary health team, the value of this role evidenced by studies overseas. The current study displays a high level of involvement by Western Australian PNs in various areas of diabetes self management education, complication screening and referral of their patients to other allied health and specialist services.

Recent Australian government changes to Medicare offer funding for various allied health services, supporting chronic disease management. These measures facilitate greater collaboration between the various health care providers, including the GP and PN working within primary care. This process enables interaction between the patient and health care team in a way that is more aligned with the ideology of the chronic

care model proposed by Wagner et al. (2001). The chronic care model places the basis of type 2 diabetes prevention and self management education and monitoring in primary care, with increasingly more involvement by the PN in implementing components of the chronic care model. However, the model of care delivery in Australia has been noted to historically align more within the principles of the Provider Substitution Model. In this model, the GP as the primary provider oversees and delegates tasks to other health providers including the PN, which may not allow full utilisation of the scope of the experienced Australian PN (Armstrong, 2005; Halcomb et al., 2005; Mills & Fitzgerald, n.d.; Porritt, 2007b; Watts et al., 2004). However, there is a paucity of literature, particularly within Australia, that identifies the numbers and diversity of role of PNs in diabetes self management education and monitoring. The PNs' desire for further role expansion within this area of chronic disease management, together with their degree of educational update, is also largely unexplored within Australia. Therefore the first objective of this study was to describe the existing roles, responsibilities and competencies of WA practice nurses in diabetes self management education and monitoring.

The current study established that PNs are involved in the provision of diabetes self management education and monitoring. Notably, this study further supports what other authors have concluded, that PNs are primarily generalist nurses with only a small proportion of their time spent in diabetes related care (Kenealy et al., 2004; Peters et al., 2001). The current study identified a wide range in hours spent in diabetes related work from zero ($n = 4$) to 25 hours per week ($n = 1$) with the mean estimated number of hours spent per week in diabetes related care being 4.5 hours; which is comparable to a study of PNs in Great Britain (Peters et al., 2001). The mode

was somewhat less at 2 hours per week in diabetes related care, however 25% of respondents did not provide any response to this question, whilst others indicated that they found it too difficult to try to estimate time spent in this area. Further to this, comments made by a few respondents indicated time spent in this area of patient care occurs in a sporadic or opportunistic way, making it difficult to quantify.

Following from this, the current study sought to investigate the manner in which diabetes related care was organised and delivered by PNs, looking as other studies have, at the use of information systems. Other authors have found the use of computerised information was an important strategy for delivering organised care; this also being a component of the chronic care model (Bodenheimer et al., 2002). Organisation is a known key factor in the systematic provision of diabetes care, with studies showing primary care practices with a PN or GP with an interest in diabetes, being more likely to facilitate this process. Similarly, the positive impact from PN involvement in diabetes registers, patient recall and diabetes clinics in terms of improved glycaemic control is supported in studies overseas (Foulkes, Kinmonth, Frost, & Macdonald, 1989; Khunti, Ganguli, & Lowy, 2001; Kirby, 2005; Meulepas et al., 2008). The current RACGP guidelines for general practice acknowledge the importance of systematic care, inclusion of other health care providers where appropriate and consideration given to individual patient needs and circumstances. Hence, encouragement of the use of diabetes registers and recalls and timely referrals to specialist and allied health professionals to facilitate a multidisciplinary team approach to diabetes care. Ongoing diabetes care is guided by chronic disease care plans and the diabetes annual cycle of care, involving periodic assessment by the GP and PN, review of therapeutic management and complication screening. These

guidelines now emphasise the higher burden of disease linked to diabetes within Australia's Aboriginal population, drawing attention to the need to consider culture and language in the delivery of patient care.

Involvement of the PN in the identification and recall of their diabetic population was determined. The current study found a high percentage of general practices had a register identifying their patients with diabetes (85%, $n = 94$). Moreover 58% ($n = 53$) of PNs could differentiate between patients with type 1 and type 2 diabetes using this register. The majority of PNs (75%, $n = 83$) had a role in operating a recall system for diabetic patients. However, in spite of the widespread use of registers and recall systems by respondents in the current study, their involvement in a practice based diabetes clinic was very uncommon (4%, $n = 5$). A few respondents indicated that their practice was in the process of setting up a type 2 diabetes clinic, which would involve the PNs. Given the lack of specialised diabetes clinics, the delivery of patient care by the majority of respondents most commonly occurred during a one to one consultation, at any given time with their patients. Many also indicated they saw patients with diabetes when specifically requested to by the GP (17%, $n = 19$); although on an ad hoc basis, this nonetheless presents an opportunity for patient assessment and the provision of diabetes self management education. The rationale given for the nature of these requests included, newly diagnosed cases requiring a random blood glucose test followed by introductory diabetes self management education, urinalysis, wound care, assessment for a chronic disease care plan and assistance with teaching self blood glucose monitoring. These episodes of patient care delivery could likely be unpredictable, as in the case of the person presenting to their GP with acute symptoms of undiagnosed diabetes. This further explains the difficulty

found by some respondents in quantifying their time spent per week in diabetes related care.

The Role of the Practice Nurse in Diabetes Self Management Education and Monitoring.

Further questioning sought to determine the specific role and responsibilities of PNs in diabetes self management education and monitoring. The current Australian "Diabetes Management in General Practice" guidelines now show a defined role for the involvement of the PN in quarterly and annual reviews with patients who have diabetes (RACGP, 2008/09). Prior to the current study these guidelines did not specifically distinguish the PN role in this manner. There were few studies found that measure the type and degree of PN involvement in a diabetes self management education and monitoring role. Therefore, information obtained from the current study will primarily be discussed against the current RACGP guidelines for diabetes management, with reference also to the "7 Self Care Behaviours" as developed by the American Association of Diabetes Educators, now endorsed by Australian Diabetes Educators. These 7 Self Care Behaviours are being active, monitoring diabetes, taking medication, problem solving skills, healthy coping and reducing health risks. These summarise the focal points in the process of educating people to optimise their quality of life and management of their diabetes. The RACGP guidelines for the review of patients with diabetes by the PN, incorporates these principles. Whilst qualified diabetes educators have attained specific knowledge and skills in diabetes self management education and monitoring, similarly the educational preparedness of the PN in this area should determine their role and scope of practice.

The current study found the majority of PNs were involved in a diverse range of diabetes related educational and monitoring activities. In terms of diabetes self management education, the most common topics included healthy eating (85%, $n = 93$), exercise (83%, $n = 86$), weight reduction (81%, $n = 83$) and smoking cessation (80% $n = 83$). In each of these areas, at least 14% of PNs indicated that they would like further training. Further to this, 72% ($n = 76$) of PNs provide education on self monitoring of type 2 diabetes, by way of self blood glucose monitoring, with 17% ($n = 20$) wanting further training in this area. All of these areas are now included within the RACGP guidelines for quarterly and annual nursing review. A little more than half of the PNs (56%, $n = 54$) provided education on sick day management, with 18% ($n = 21$) indicating they wanted further training in this area, an area not listed as part of the nursing review within RACGP guidelines.

In the current study there was a statistically significant association between those PNs who had completed diabetes related continuing education and the greater likelihood of providing diabetes self management education to patients with type 2 diabetes in the areas of self monitoring of diabetes, dietary and exercise advice, smoking cessation, weight loss and sick day management. Further to this, the extent to which PNs provided education in the area of insulin therapy was examined; few within the current study were involved in teaching or monitoring their patients who were prescribed insulin therapy. Twenty percent ($n = 23$) of PNs provided education to patients on insulin initiation, even less (9%, n = 10) advised patients on how to adjust their insulin based on self monitored blood glucose levels and only 6% ($n = 7$) advised on medication adjustment based on their own clinical judgement. No other

literature could be found to compare this data with other PN populations. In this instance almost a quarter of respondents indicated they would like more training in these less commonly performed roles of insulin initiation education (21%, $n = 25$), advising patients on how to adjust their insulin based on self monitored blood glucose levels (25%, $n = 29$) and advising insulin adjustment based on the PNs own clinical judgement (21%, $n = 25$). Again, a statistical association was found between those PNs having completed diabetes related continuing education and the greater likelihood of providing education in insulin initiation and adjustment in the current study.

Historically insulin conversion has been the domain of the specialist diabetes centre, however there is growing pressure for primary care to undertake this role of converting people with type 2 diabetes from oral medication to insulin, in order to optimise glycaemic control (Greaves et al., 2003). When Greaves et al. interviewed 25 PNs in the United Kingdom concerning their views on insulin conversion the issues of time, training and ongoing support were the main barriers identified. Whilst this study was small, the authors concluded that ongoing training and system support in the way of protected time and professional mentoring, together with a team approach to patient care, are measures to support the changing role of the PN. Findings from the current study therefore lend support to what other authors have found that a lack of training can act as a barrier to the expansion of the PN role.

Diabetes self management education related to insulin therapy and sick day management is not included as part of the PN role within the current RACGP guidelines, which appear to be aimed at the generalist nurse. However, it is apparent

from this study, that a proportion of PNs view these areas of diabetes self management education and monitoring as a current or potential role within their scope of practice, whilst recognising a need for more training. It is a positive finding in the current study that PNs who have completed formal post graduate study in diabetes education are more likely to be involved in specialised areas such as insulin therapy. However, results from the current study raise concerns where the PN may be taking on responsibilities prior to obtaining the necessary knowledge and skills required to safely extend their role into these more specialised areas of diabetes education. Kenealy et al. (2004) similarly noted in a longitudinal survey of New Zealand PNs, that an increased role in complex diabetes care was not limited to those PNs reporting additional training. In this same study, the expanding role of the PN in diabetes care was seen to be influenced by the GP and characteristics of the individual practices, with subsequent variation in the roles, training and competencies of PNs.

Diabetes monitoring roles, for which PNs in the current study participated, are included within the current RACGP guidelines for nursing review. These roles include random blood glucose checks (84%, $n = 90$), measuring weight (80%, $n = 89$), blood pressure (77%, $n = 84$) foot care (62%, $n = 66$) and visual acuity (53%, $n = 55$). Two other smaller Australian studies have likewise found PN involvement in these areas (Hollis, 2007; Lee & Stevenson, 2007). In the current study the assessment of sexual functioning whilst undertaken by some PNs, proved a much less common clinical role (17%, $n = 15$) and is not included in the current RACGP guidelines as part of the nursing review. Further questioning identified that PNs would like more training in particular in the areas of foot care checks (23%, $n = 27$), visual acuity (25%, $n = 29$) and sexual functioning (28%, $n = 33$). Noting these are the areas with a

lesser number of PNs involved, suggests the majority of respondents may consider these areas of monitoring outside their current scope of practice, with a need for further training.

Only a small number of respondents indicated they had completed accredited post graduate studies at a tertiary level which would provide the necessary knowledge base to undertake diabetes self management education, more of which will be discussed later. Others have raised similar concerns with the disparity between PN role and educational preparedness. In particular a New Zealand study showed increased PN involvement in specialised diabetes care over ten years, irrespective of degree of educational preparation in diabetes education (Kenealy et al., 2004). Kenealy et al. found in their study comparing the role of the PN in New Zealand in 1990 and 1999, time available to be involved in diabetes self management education and care was unchanged even though the complexity of needs for people with diabetes had increased. Respondents in the current study indicated that where they did have a role in more specialised areas of monitoring and education, it most commonly occurred on a "prn" basis, meaning as required. This raises the question, if the PN is required to expand their role to meet a more specialised level of care, how easily will they be able to develop and consolidate the necessary knowledge and skills, if their role is primarily that of a generalist nurse. However, with the RACGP diabetes guidelines now inclusive of a defined role for the PN, time spent by the PN with people with diabetes may need to be better planned. A more structured approach to care delivery may be beneficial, for example through the initiation of diabetes clinics.

There is scope for PNs to expand their role in chronic disease care within a multidisciplinary team; however barriers exist within the current Australian system of primary care delivery (Harris & Zwar, 2007). The current RACGP guidelines encourage a team approach to diabetes management, with the patient as the central member and the GP as coordinator of care. Other members of the team may include a Diabetes Educator, Dietitian, Podiatrist, Ophthalmologist and Endocrinologist. The current study sought to identify the role of the PN in referring patients for further assessment and diabetes education. Over half of respondents acknowledged the ability to make these referrals, highlighting the important role the PN has in proactively facilitating a multidisciplinary team approach to patient care. Most commonly that referral was to a Diabetes Educator (50%, $n = 59$), followed by Podiatrist (45%, $n = 53$), Dietitian (42%, $n = 50$), Ophthalmologist/Optometrist (25%, $n = 29$) and Endocrinologist (10%, $n = 12$). As previously highlighted the Credentialled Diabetes Educator will have completed formal post graduate studies in diabetes self management education, along with clinical practice and a commitment to continuing professional development in this area. Therefore, the Credentialled Diabetes Educator may act as a resource and mentor for other health professionals in this area, which includes the PN with developing skills and role expansion into different areas of diabetes self management education (Australian Diabetes Educators Association, 2008).

EDUCATIONAL PREPAREDNESS

The second objective sought to determine the educational preparedness of PNs for undertaking diabetes self management education and monitoring. In general, respondents indicated they had acquired a wide range of post graduate qualifications. The most common post graduate qualifications were in asthma education (20%), immunisation (14%) and women's health (12%); all areas of primary health care where the PN has for some time now had a defined role, supported by way of Medicare reimbursements. The 2007 National Practice Nurse Workforce survey also found the areas of immunisation (27%), women's health (11%) and asthma education (7%) common post graduate qualifications (Porritt, 2007a). In this survey 18% more PNs reported additional qualifications compared to the national survey performed in 2005. The mix of other skills being taken into the general practice setting would likely be influenced by the PNs previous working experience and these included paediatrics (6%), emergency and/or critical care (5%) and coronary care (2.5%). Within the current survey only 2.5% of PNs indicated they had completed specific practice nurse post graduate studies.

Increasingly, various post graduate courses are becoming available specifically to meet the educational needs of nurses working in general practice, focusing on issues such as managing chronic disease. Courses such as the Graduate Certificate in Nursing (General Practice), online chronic disease care planning modules, and leadership and management courses for nurses working in primary care are now available through the collaborative efforts of universities, Divisions of General Practice and The Royal College of Nursing. The benefits of such courses lie in the

fact that they cover health and management issues, in a manner that is applicable to the primary care setting, offering distance education and financial support through government scholarship. Respondents in the current study displayed a low level of involvement in diabetes and PN specific continuing formal education. The majority of respondents indicated they had not completed diabetes related continuing education. In spite of this, the current study shows a small number of PNs already working in what could be considered a more advanced practice role in diabetes self management education, such as that undertaken by credentialled diabetes educators. Examples of this include patient education in insulin initiation and adjustment, sick day management, self monitoring of diabetes and dietary advice. Yet, results of the DKT showed some deficiencies in PN knowledge relevant to some of these areas.

Other studies have noticed low uptake of continuing professional development opportunities in diabetes by hospital nurses (Findlow & McDowell, 2002; Nugent & Kinsman, 2003) and PNs (Hollis, 2007). However, in all settings nurses are increasingly involved in the care of patients with diabetes, raising concerns for the degree in which patients are receiving optimal diabetes care (Rubin, Moshang, & Jabbour, 2007). In view of the emergence of continuing education specifically designed for PNs there may now be a greater uptake by nurses working in general practice, of opportunities to increase their knowledge of chronic disease management principles, in particular diabetes management.

Diabetes Knowledge Test

The Diabetes Knowledge Test (DKT) from the University of Michigan was included within the survey in an effort to gain insight into the general diabetes knowledge of respondents given the diversity of roles the respondents were engaged in. The overall mean score for the DKT was 17.5 ($SD \pm 3.28$) or 79.5% correct, from a possible score of 0 to 22. This compares favourably with the findings of Scheiderich, Freibaum and Peterson (1983) who found the average score to be 74% in a cohort of hospital registered nurses on a similar knowledge test. Results of the DKT used in the current study are now discussed against information gathered on PN demographics and their role in diabetes management.

Participants in the current survey generally scored well within the dietary subscale of the diabetes knowledge test, however the use of terminology such as "free food" may have appeared confusing to some respondents leading to lower scoring in that item, with 71% ($n = 72$) answering correctly. Within the blood glucose monitoring subscale participants understood the best method for glucose testing and factors that affect blood glucose levels including food and exercise. However, only 63% ($n = 71$) correctly answered a question on hypoglycaemia treatment, raising very real concerns of a gap in PN knowledge in what could be considered a basic assumption of any nurses' general knowledge level. Considering the commonality of hypoglycaemia this deficiency is of some concern. Despite this, respondents' knowledge of complications of diabetes was generally high. This compares well with the generally high level of PN involvement in education and monitoring related to certain aspects of prevention of diabetic complications, such as those included within the guidelines to meet the

annual cycle of care. However, not all aspects were well understood. For example, less than half of PNs were familiar with signs of diabetic ketoacidosis (DKA) and most concerning was the 28% ($n = 29$) of nurses who thought low blood glucose was a sign of DKA. This indicates substantial lack of understanding of the pathophysiology of hyperglycaemia amongst some respondents. Diabetic ketoacidosis potentially constitutes a medical emergency and as such prompt recognition by health care professionals is imperative. In contrast Findlow and McDowell (2002) found that hospital nurses were more adept at recognising and treating DKA. These results may be partly explained by the fact that patients acutely unwell with DKA will most likely be managed in hospital; however individuals, in particular those with undiagnosed type 1 diabetes often initially present unwell to their GP and an accurate diagnosis of DKA or the potential for its development at this point of care is vital.

Within the current study, understanding of insulin therapy showed the most variable scores, with the lowest item score at 49% and the highest 96%. Of the six questions pertaining to insulin and related problem solving skills the mean score was 4.41 ($SD \pm$ 1.54). In the DKT, use of the terminology "insulin reaction" may have contributed to lower scores if respondents were unfamiliar with this term. This terminology is used within the literature and within the current study a further question used the same terminology with considerably higher scoring. Nevertheless, these results are not surprising given the very low level of involvement of the sample group in insulin related patient education and similarly low completion rate of specialised tertiary diabetes education studies. Scheiderich et al. (1983) found hospital RNs who scored lowest in the DKT consistently incorrectly answered questions on the effects of exercise and identification of hyperglycaemia. The same pattern was seen in the

present study. Likewise, Hollis (2001) also found lower scoring in DKT questions related to medication including insulin amongst PNs.

Associations were sought between variables relating to the organisation and delivery of patient care and PN diabetes knowledge. The RACGP guidelines recommend a systematic approach to care utilising disease registers and recall systems. The current study identified a greater knowledge in the area of monitoring blood glucose levels (p = .031), in those PNs who spent greater than 2 hours per week in diabetes related care, compared to those who spent less than 2 hours per week. Hollis (2007) also found that PNs who worked a greater number of hours per week in diabetes related care scored the highest on a diabetes knowledge test developed by the National Association of Diabetes Centres. It would appear then that the greater exposure for those PNs spending more time in diabetes related care enables them to develop more knowledge in this area.

Further to this, those PNs whose practice had a register of diabetic patients, had a higher mean rank in the total DKT score as well as the subscales for blood glucose testing, complications and insulin; however, these results were not statistically significant. Whilst few PNs (16%, n = 19) had been involved in clinical audits of diabetes care within the previous 12 months, those who had scored significantly higher in the total diabetes knowledge test (p = .037), as well as the complications subscale (p = .009). Those respondents with a role in teaching patients in the area of self monitoring of type 2 diabetes, scored significantly higher on the items in the insulin subscale (p = .036). Current RACGP (2008/09) guidelines recommend home

blood glucose monitoring for all patients with type 2 diabetes, therefore this is an important area for the PN to feel confident in their ability to teach patients.

The number of years participants had worked as a PN was considered in terms of the amount of diabetes specific knowledge and skills that may be gained over time working in primary care. For analysis this was grouped into greater than and less than five years; however, no significant difference in DKT scores and years of experience was identified. Almost half (47%) of PNs had worked for less than five years in this role and 52% of PNs had been involved in diabetes related care in the general practice setting for less than five years. Although not significant, those with less than five years experience in diabetes care had a higher diabetes knowledge test mean rank than those with greater than five years experience in diabetes care in the general practice setting. Gossain, Bowman, and Rovner (1993) used a Diabetes Basic Knowledge Test, similar to that used for the current study and found hospital nurses with fewer years of experience scored significantly higher than those with greater years of experience. A smaller study conducted in regional New South Wales looking at PNs' knowledge in diabetes management, found that the number of years experience as a PN similarly was not a predictor of higher diabetes related knowledge (Hollis, 2007). It may be that nurses new to this role seek educational updates, or may take on this role having already attained post graduate training in diabetes. Therefore years of experience in this role are not necessarily a reflection of the registered nurses novice or expert status in this area.

In terms of ongoing education in diabetes, in the current study, respondents who had completed diabetes related continuing education displayed a higher level of

knowledge in the diabetes knowledge test in general, however this was not significant. Other studies have identified amongst both PNs (Hollis, 2007) and hospital nurses (Rubin, Moshang, & Jabbour, 2007) an association between continuing education in diabetes management and higher diabetes knowledge test results. Notably a study of 245 hospital nurses in Hong Kong found nurses perceived diabetes knowledge with actual knowledge of diabetes was statistically significantly correlated (Chan & Zang, 2007). Gossain et al. (1993) found a direct relationship between perceived knowledge and number of correct responses on a similar Diabetes Basic Knowledge Test. However Findlow and McDowell (2002) found that nurses' perception of knowledge had little bearing on the actual score achieved in diabetes knowledge testing. In consideration of the fact that Australian PNs now have a defined role in diabetes management in the general practice setting, which assumes the knowledge and skill of the nurse, the onus must lie with each individual to realise their own scope of practice and the need for ongoing educational updates.

BARRIERS AND FACILITATORS TO THE PRACTICE NURSE ROLE

The third objective of the current study was to identify the restraining and driving factors that influence the provision of diabetes care by practice nurses. A questionnaire developed by Honan et al. (1998) was used to assess nurses' attitudes towards factors that may influence their ability to provide patient education related to diabetes. These responses were grouped under four different subscales. Practice nurses were also asked through open ended questioning to list any other factors that they considered restricted or assisted them in providing diabetes self management education in the general practice setting.

Barriers

In the current study, factors that PNs considered acted as a barrier to their role in patient education were identified through the PN attitude questionnaire and further open ended questioning. Time was identified by 53% of the participants ($n = 46$) in the open ended responses as the biggest barrier to providing diabetes self management education. This was confirmed again in data from the nurses' attitude scale, which identified time/resources and space as significantly influencing their role in insulin initiation ($p = .014$), making adjustments to insulin dose ($p = .001$), sick day education ($p = .002$) and assessing the diabetes related educational needs of their patients ($p = .002$). Those PNs spending more than two hours per week in diabetes related work placed a significantly higher level of importance in patient teaching and rated time/resources and space as influencing their involvement in patient education ($p = .010$). Time has previously been identified as a major barrier to the nurses' role in patient teaching in other studies conducted in Australia (Senior, n.d.) and overseas (Marcum, Ridenour, Shaff, Hammons, & Taylor, 2002). When Pascoe et al. (2007) interviewed 222 Australian PNs to determine their educational needs; time was again identified as a barrier however in this instance its impact on their ability to undertake training and education was raised. In this same study, 78% of PNs rated diabetes self management education as one of their most important roles. Within the current study 45% of PNs identified their own level of knowledge as a barrier to engaging in diabetes self management education and monitoring.

Other researchers have found lack of education, training and confidence to perform a role, acted as a barrier for PNs (Greaves et al., 2003; Lee & Stevenson, 2007; Peters et al., 2001; Wagner at al., 2001).

Further to this, other barriers highlighted within the current study have likewise been identified in studies overseas, including beliefs of GPs (17%) and lines of responsibility in terms of what should constitute the role of the PN against that of the GP (23%); highlighting that the delineation of roles and responsibilities in general practice is a complex process (Halcomb et al., 2008; Kenealy et al., 2004; Peters, 2001). In further support of this finding, Watts et al. (2004) identified that trust arose as an important element in the establishment of working relations and delegation of responsibility between the GP and PN. To further explain this point, Watts et al. further suggest the role of the PN is likely to be centred in areas of a high degree of certainty and agreement within the literature, as to what constitutes best clinical practice. Examples of this are the provision of childhood immunisations, wound care and cervical screening, having clear and accessible clinical guidelines for nursing practice. This is reflected in the instigation of specific MBS item numbers, providing financial reimbursement to general practice, for the PN to perform these roles. However, as Mills and Fitzgerald (n.d.) highlight, the current model of general practice funding through task allocation, may be limiting in terms of the care nurses are able to provide.

Facilitators

Factors considered to encourage the likelihood of the PN having a role in patient education, were identified using the nurses' attitude questionnaire and open ended questioning. From this, the current study found PNs commonly placed a high level of importance on their role in teaching patients about diabetes, whereby 82% (n = 97) agreed or strongly agreed with the statement *"Patient teaching is a high priority in my nursing care"* . Eighty nine percent (n = 105) of respondents agreed or strongly agreed with the statement *"Patient teaching is an important part of nursing practice for me";* similarly an American study utilising this nurses' attitude questionnaire found 88% (n =124) of nurses' also agreed with this comment (Marcum, Ridenour, Shaff, Hammons, & Taylor, 2002). Australian PNs in Victoria have likewise identified their role in teaching patients as an important part of their practice (Lee & Stevenson, 2007). Further to this, in the current study, over 80% of PNs showed a willingness to attend in-service education in teaching and learning techniques.

Practice nurses in the current study, who spend more than two hours per week in diabetes related care had significantly higher mean scores overall (p = .025), as well as in the subscale of PN attitude (p = .019) indicating higher agreement with these items as influencing their involvement in patient education related to diabetes. Similarly, those PNs who had completed diabetes related further education, showed significantly higher mean scores, in terms of overall agreement with factors influencing their involvement in patient education (p = .024). Further to this, those PNs involved in a clinical diabetes audit also displayed a significantly higher mean score (p = .036) in terms of their positive attitude overall towards patient teaching.

Where patient teaching occurred in a more formal way, documentation of this nursing role was more likely to be performed (67%, $n = 74$). Practice nurses identified The Divisions of General Practice (29%, $n = 16$), GPs (21%, $n = 12$) and Diabetes Educators (16%, $n = 9$) as professional resources to assist in their role in diabetes self management education. Further to this, the use of patient information packs was highlighted by respondents as a useful resource (21%, $n = 12$). The PNs level of knowledge and experience in performing this role was viewed favourably by 27% ($n = 15$) of respondents in their provision of diabetes self management education.

The role of the PN in diabetes care warrants further consideration in light of the expansion of their scope of practice, within the current RACGP guidelines. There is now a clear evidence base from large randomised trials, enabling the development of guidelines and protocols for the clinical management of diabetes in primary care. The current RACGP diabetes management guidelines support the ideology of the 7 Self Care Behaviours of diabetes self management education. Consequently the PN, adequately prepared, may have a substantial role in diabetes management, due to a high degree of certainty in the ongoing clinical management and complication screening of diabetes. Conversely, as the evidence base recedes, in terms of clear guidelines for clinical practice and the care becomes more complex, the role of the GP becomes far more significant and the PN less significant (Watts et al., 2004). Further to this, the role of the diabetes educator is a valuable resource to the general practice team, when diabetes care becomes more complex.

STRENGTHS AND LIMITATIONS OF THE STUDY

There are several limitations to the present study, to be considered in terms of the validity of the methodology used. In terms of the sample size, caution is exercised in interpreting the results, due to the fact that the sample size is smaller than that required to be representative of the population. This can limit the ability to generalise the results outside of the sample group. However, despite the sample size being smaller, participant demographical data were representative across the population and compared favourably with other similar Australian studies of PN demographics. Apart from one of the smaller divisions of general practice, all other divisions are represented within the current study. In addition, respondents represent rural and metropolitan regions of WA, with both registered and enrolled nurses. Further to this, the current study has captured respondents across a wide spectrum of professional association within this role. This includes number of years worked as a PN, for example from novice to more expert, weekly hours of employment as a PN and the proportion of those hours spent in a diabetes education role. In view of these factors, generalisability of the results of the current study may be considered.

It is noted that the population of PNs in Western Australia is geographically dispersed throughout the state. It could have been possible to access the population through the membership database of the Western Australian Practice Nurses Association (WAPNA), however given its membership is voluntary, the decision was made that the Western Australian General Practice Network (WAGPN) could offer the broadest reach. This is in view of the high number of general practices and hence PNs, affiliated with their local division of general practice.

Due to reasons of privacy, mail out of surveys was permitted only via project officers within the thirteen divisions of general practice, whom had access to their own PN database. Consequently, the researcher did not have control over the distribution of surveys. Initially, it was considered that in order to attempt to include PNs who may not have involvement with a division of general practice, the WAPNA could also be utilised, however the restrictions due to privacy meant contact details of individual PNs could not be made available to the researcher. Accordingly, there could be no guarantee that each respondent would receive only one survey and costs prohibited the posting of duplicate surveys. However, the WAGPN were most accommodating in agreeing to forward follow up emails to their PNs', in an attempt to increase the rate of return of completed surveys that had been distributed through the Divisions, which proved somewhat effective.

An extensive literature search was performed to seek an established survey tool, however no other one was available at the time. Therefore, in order to capture and enrich the findings of the study pertaining to the objectives, the final survey comprised two scales, including a Diabetes Knowledge Test and a questionnaire to assess nurses' attitudes to patient education. This raised issues of the reliability of the final survey, more apparent when data was analysed. Nevertheless, scale reliability of the Diabetes Knowledge Test used in the current study ($\alpha \geq 0.70$) was shown to compare favourably with that of the original developers of the tool (Fitzgerald et al., 1998). Further to this, items of the DKT were also formed into four subscales, in order to facilitate examination and discussion of the different areas of knowledge related to diabetes. Subsequently, the two subscales of questions related to diet and blood

glucose testing, had low alpha values. Whilst the sample size was adequate; each of these subscales had fewer items, which can be more likely to produce a low alpha value (Nichols, 1999). In view of this, caution must be exercised in any interpretation of these subscales. Further to this, the subscale of complications had only a marginally better alpha value, whilst the insulin subscale was acceptable ($\alpha = .70$). Again, caution must be exercised in the interpretation of data resulting from these subscales.

Scale reliability of the overall nurses' attitude questionnaire was found to be less than adequate ($\alpha = .640$), with two subscales producing low alpha scores and a third looking at the issue of documentation only marginally improved ($\alpha = .658$). Again, these subscales had a low number of items in each and could not be improved with removal of any items. However, the subscale examining PN attitudes and beliefs in the area of patient teaching, had the highest number of items and highest alpha value ($\alpha = .731$), responses to these items also comparing favourably to that found in other studies using this tool. An alpha value was not provided in previous studies utilising this tool, so no comparison can be made in terms of the reproducibility of this scale. However, results from the current and other studies utilising this tool, compared favourably (Marcum, Ridenour, Shaff, Hammons, & Taylor, 2002). In spite of this, caution must still be exercised in the interpretation of results from this questionnaire. Where data was obtained from the scale of nurses' attitudes surrounding patient education issues, normality was assumed with the Kolmogorov-Smirnov statistic being greater than .05 and through visual inspection of the histogram, therefore allowing in this instance for more rigorous parametric testing to be reported on. Where findings are significant, the potential for Type 1 error cannot be overlooked.

However whilst multiple analyses are made of dependent variables, a comparison is only ever made between two groups.

Whilst a pilot of the formed survey tool was considered, time pressures and deadlines for the dissemination of surveys ultimately prevented this from happening. This limitation to the current study may be illustrated in terms of the diabetes knowledge test, where scoring on some items may have been improved if specific terminology was more appropriately directed towards Australian PNs.

The majority of this sample group are Registered Nurses, who will have had a longer initial period of hospital based or tertiary undergraduate nursing education, compared to Enrolled Nurses. The expectation therefore would be that the initial general educational preparation between Registered and Enrolled Nurses would differ. This may also potentially impact upon the Enrolled Nurses ability to undertake postgraduate tertiary study. However in terms of the DKT, there were not enough Enrolled Nurses to analyse discretely.

Finally, in view of the size of the survey, it may have been deemed too prohibitive by some respondents in terms of the time they felt they would need to allocate for completion and return of the survey, perhaps influencing the final response rate. Nonetheless, one advantage of a mailed questionnaire such as this lies in the fact that it offers greater anonymity which is reflected by the openness and frankness of responses to the open ended questions, regarding views on perceived barriers in the workplace and what it is PNs would like to change.

RECOMMENDATIONS

The current study has highlighted that amid the increasing prevalence and associated burden of chronic diseases such as diabetes, a coordinated approach to primary health care delivery is needed to assist individuals to optimise health outcomes. Given that PNs constitute a growing workforce within general practice, with a recognised scope of practice in diabetes care, the strengths and barriers to this role progression that have been identified in the current study, recommend the need for gaps that may exist in current care delivery be addressed.

In view of the high level of involvement of PNs in diabetes care, displayed by the current study, it is recommended that further research to measure the efficacy of the Australian PN role in terms of patient health and wellbeing outcomes, be examined in line with the advancement of this role. Equally, further studies looking at the current role of the Australian PN in diabetes care, should be performed with a larger sample group. It is also recommended that a stronger, in terms of reliability and validity, piloted research instrument is utilised in future studies. Such investigations should aim to add valuable insight, to inform long term primary health care delivery modelling.

Respondents in the current study identified barriers that exist in accessing ongoing education, particularly in terms of time available for professional development. Further to this, the current study has identified that PNs want to be further supported in their continuing professional development, to acquire the necessary knowledge and skills prior to the uptake of an expanded role, a view supported by other studies.

In the current study, The Divisions of General Practice were highlighted as a useful resource in terms of providing patient education material and opportunities for ongoing professional development. Therefore, it is recommended that the supportive role of the Divisions of General Practice be further expanded to facilitate ongoing professional development for PNs. Further to this, the Divisions of General Practice could enable access to primary care based credentialled diabetes educators. The benefits of this service include expert advice, particularly where patient care is more complex, facilitating diabetes specific educational updates, assistance with establishing diabetes clinics and providing mentorship for PNs. In particular, PNs with formal post graduate training in diabetes education, who may have taken on an advanced practice role in diabetes self management education within their workplace, would benefit from the mentorship of a credentialled diabetes educator who has insight and knowledge of the specialty of general practice nursing. Professional support and resources such as these may be unique to meet the needs of that particular division and its population cohort.

Barriers that were highlighted in the current study such as the lack of time and a dedicated workspace, varying level of support from the GPs and practice centre, as well as delineation of roles, suggests the need for change in the system of care delivery. The recommendation therefore, is that further deliberation be given, towards implementing a model of primary health care delivery, which has scope to financially support the contribution of the PN within a multidisciplinary health team. This may prove particularly beneficial, in terms of support to the patient and practice, where the PN has advanced practice skills in diabetes management. The chronic care model has

been highlighted within the current study, as an example of a multidisciplinary focused methodology, which has been successfully implemented overseas. Further research into the role and scope of the PN in meeting primary health care needs in Australia is timely, and follows the already established PN role in countries overseas. Further to this, a repeat study to explore changes to the PN role, in light of the recent inclusion within RACGP guidelines of an identified role for the PN in diabetes care would be valuable.

Finally, the advancement of a clear professional pathway will be fundamental to the development of this nursing role and retention of the growing number of nurses choosing to work in this primary care setting.

CONCLUSION

This study has described the scope of practice, responsibilities and educational preparation of PNs in diabetes related care and highlighted factors that influence and impact upon nurse initiated diabetes care delivery. Within Australia, the growing prevalence of diabetes and related comorbidities will continue to place greater pressure on primary health care services. In order to assist individuals to optimise their health and wellbeing, the principles of diabetes self management education, ongoing health monitoring and complication screening with the systematic utilisation of diabetic registers and recall systems, are indicated as part of the ideology of the chronic care model, within which the PN can have a role to perform (Horton, Cefalu, Haines, & Siminerio, 2008; Piatt et al., 2006). Overseas studies indicate an already established role for the PN in diabetes care and some have measured the positive

impact of this role in terms of the systematic delivery of diabetes care and positive health outcomes. Within the primary care setting of Australian general practice, there is now a defined role for the PN to assist in the ongoing monitoring and education of their patients with diabetes (RACGP, 2008/09). A function of this role is to assist the GP in optimising the health and wellbeing and preventing or lessening the impact of the myriad short and longer term complications, for people with diabetes. This role definition did not exist at the time of data collection for the current study. However, the current study shows a high degree of PN involvement in various areas of diabetes self management education and monitoring, and the facilitation of a multidisciplinary service to individuals through their role in liaison and referral. Moreover, the current study has shown that formal educational preparedness does not always precede the PN undertaking a role in areas of diabetes self management education which in some cases would require specialised knowledge and skills. Further to this, in the current study, completion of diabetes related education, was more likely to result in a more advanced practice role in diabetes education ($p < .05$). Considering the fact that data from the current study was obtained prior to the formation of guidelines that suggest a role the PN may have in diabetes care, there may now be an even greater expectation for the PN to take on additional responsibilities in diabetes management. Further to this, PNs in the current study displayed a high level of agreement in terms of the importance of acquiring specific knowledge and skills in order to teach diabetes management skills.

Despite the high numbers of PNs in the current study involved in various areas of diabetes self management education and complication screening, barriers do exist, predominantly time and resources available to perform this role. Practice nurses

indicated their own knowledge deficits, also evidenced by the DKT results, and delineation of their role in working alongside the GP, were notable barriers. Further to this, the organisational set up of the general practice, together with funding issues related to Medicare reimbursement for nursing services, were identified as barriers. Yet, a real strength highlighted in the current study, lies in the high value that PNs place on their role in teaching patients important lifestyle measures for optimum health and wellbeing. So too, their ability and motivation to facilitate wholistic care for individuals, through their liaison and referral role.

Practice nurses in the current study displayed resourcefulness in developing this facet of their role, one which otherwise requires many different skills, to meet the needs of a primary health care setting. This is evidenced by their utilisation of information and services through the Divisions of General Practice and community resources such as Diabetes Australia and diabetes educators, together with their working relationship with GPs. These factors together highlight the important contribution that can be made by the PN, within the multidisciplinary primary care team.

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APPENDICES

First reminder email sent on the 15th April 2007 stated:

"You may recall at the end of last year receiving a survey considering your role in the care and education of your diabetic patients.

Like me, your involvement in this area is probably increasing or maybe you or your GP's would like it to increase in response to the growing demand. I am not sure how you are managing this role but would love to find out more from you. The information you provide will allow me to raise awareness of our skills, professionalism and (importantly) educational needs to allow us to meet our patients' needs in the rapidly growing area of chronic disease management in primary health settings.

To do this I NEED MORE SURVEYS PLEASE."

The second email sent on the 2nd May 2007 stated:

"I wanted to express my appreciation and thanks to all of you who completed my 'Practice Nurse –diabetes care'; survey in recent weeks or late last year.

Any boost in the number of surveys returned has such a big impact on how we can use this information "the more surveys, the more practice nurses that are accurately represented"

*By creating awareness of our skills, professionalism and (importantly) educational needs, we are better placed to seek and receive the support and recognition for our contribution to patients and as important members of the health team. This email is also a **last call** for anyone who can manage a spare moment to fill out the survey now and return to me. Every bit counts."*

School of Nursing and Midwifery

**The roles and responsibilities of WA General Practice Nurses
In diabetes care and management**

_____
_

Please indicate your response by placing a tick, or written response in the appropriate box or space provided, for each question.

PART A - Some questions about you and your current position.

1. Which Division of General Practice does your practice come under?

    _____

    What is the post code for your workplace? ☐☐☐☐

2. How long have you worked as a practice nurse? *(to the nearest year)* ☐☐

3. What is your current job title? *(tick all that apply)*

    Registered Nurse ☐
    Registered Midwife ☐
    Enrolled Nurse ☐
    Credentialled Diabetes Educator ☐
    Other ☐

    If you have ticked "Other", please specify what professional qualifications you hold

    _____

4. What formal study have you completed or are currently undertaking (if any) in diabetes education? *(tick all that apply)*

Studies Currently Being Undertaken	Studies Completed
University Graduate Certificate in diabetes education ☐	University Graduate Certificate in diabetes education ☐
University Post Graduate Diploma in Diabetes Education ☐	University Post Graduate Diploma in Diabetes Education ☐
3 Day Generalist Course (Diabetes Australia) ☐	3 Day Generalist Course (Diabetes Australia) ☐
Other ☐	Other ☐
Please specify -----------------------------------	Please specify -----------------------------------
None ☐	None ☐

5. Apart from diabetes education qualifications what, if any, other post basic qualifications or postgraduate qualifications do you hold? (*Please give details*)

_____

_____

_____

6. How many years have you been involved in providing diabetes related care in the general practice setting? (*To the nearest year*) ☐☐

7. How many hours are you employed to work each week as a Practice Nurse? (*to the nearest hour)* ☐☐

Of these hours how many do you spend in diabetes related work? ☐☐

_____

PART B – This section contains questions about your current contribution to the management of Type 2 diabetes in your practice.

8. What is your practice population size?

_____

If you have the information, please give the size of the diabetic population of your

practice? _____

9. Does your practice have a register of diabetes patients? Yes ☐
No ☐

If **yes**, can you differentiate between Type 1 and Type 2 from the register? Yes ☐
No ☐

10. Do **you** have a role in operating a recall system for diabetes patients in your practice?
Yes ☐
No ☐

11. When do you see patients with diabetes (*please tick all that apply)*;
During a diabetes clinic ☐
During one to one consultations at any time ☐
During group education sessions ☐
Other ☐

If you have ticked "Other", please give details

_____

_____

Please tick the boxes that best describe what you as a practice nurse currently do to monitor patients with Type 2 diabetes in your practice. Where relevant, please indicate how often you do this.

12. Do **you** (the general practice nurse) monitor Type 2 diabetes patients for:	*Yes*	*If Yes How often do you do this for each patient?*	*No*	*If no would you like to do this?*	*Would you like more training in this area?*
a) Blood pressure					
b) Weight checks					
c) Foot care checks					
d) Visual acuity					
e) Sexual functioning					
f) Blood glucose levels					
13. Do you provide education to patients when insulin therapy is first initiated?					
14. Do you advise patients on how to adjust their own medication (such as insulin, based on home monitored blood glucose levels)?					
15. Do you advise medication adjustment (such as insulin dose) on your own clinical judgement?					
16. Do **you** provide health education to patients with Type 2 diabetes in terms of the areas listed below					
a) Self monitoring of Type 2 diabetes					
b) Healthy eating advice					
c) Exercise advice					
d) Stop smoking advice					
e) Weight reduction advice					
f) Sick day management					
g) Other (please state areas) _____ _____					
17. Do you assess the patients' diabetes related educational needs					

18.   Do you have a practice protocol in the management of the following?

Protocol	*Yes we have a practice protocol* Place a tick if yes √	*PN were involved in writing protocol* Place a tick if yes √
Weight reduction		
Exercise routines		
Hypertension management		
Smoking cessation		
Adjusting diabetes medication		

19.   Do you undertake screening of 'at risk' groups for diabetes?

      Yes ☐

                                                        No ☐

If yes, please explain what you do

_____

_____

_____

20.   Have you undertaken a clinical audit of any aspects of diabetes care in the last twelve months?

                                              Yes ☐

                                              No ☐

If yes, please give details

_____

_____

_____

_____

21.   Are **you** able to make referrals to any of the following (tick all that apply):

      Diabetes Specialist Nurse / Diabetes Educator ☐

      Hospital Consultant/ Endocrinologist ☐

      Dietician ☐

      Ophthalmologist / Optometrist ☐

      Chiropodist/ Podiatrist ☐

      Other ☐

If you have ticked "Other", please give details

_____

22.   What is the one thing **you** would like to change to improve the care you provide to people with Type 2 diabetes?

_____

_____

23.   What do **you** think is the ONE best thing about the care you currently provide to people with Type 2 diabetes?

_____

_____

_____

_____

24.   Is there anything else you would like to add about your current role in diabetes care and education?

_____

_____

_____

_____

PARTC – Diabetes Knowledge Survey; provides an indication of your understanding of diabetes management principles.

Please complete this without referring to any aids, we are trying to determine how best to assist GPNs in their practice

The author of this survey would like to acknowledge the University of Michigan's Diabetes Research and Training Centre, for the use of their survey.

25. The diabetes diet is:

a) the way most Australian people eat ☐

b) a healthy diet for most people ☐
c) too high in carbohydrate for most people ☐
d) too high in protein for most people ☐

26. Which of the following is highest in carbohydrate?

a) baked chicken ☐

b) swiss cheese ☐

c) baked potato ☐

d) peanut butter ☐

27. Which of the following is highest in fat?

a) low fat milk ☐

b) orange juice ☐

c) corn ☐

d) honey ☐

28. Which of the following is a "free food"?

a) any unsweetened food ☐

b) any dietetic food ☐

c) any food that says "sugar free" on the label ☐

d) any food that has less than 20 calories per serving ☐

29. Glycosylated hemoglobin (HbA1c) is a test that is a measure of your average blood glucose level for the past:

a) day ☐

b) week ☐

c) 6-10 weeks ☐

d) 6 months ☐

30. Which is the best method for testing blood glucose?

a) urine testing ☐

b) blood testing ☐

c) both are equally good ☐

31. What effect does unsweetened fruit juice have on blood glucose?

a) lowers it ☐

b) raises it ☐

c) has no effect ☐

32. Which should not be used to treat low blood glucose?

a) 3 hard candies ☐

b) ½ cup orange juice ☐

c) 1 cup diet soft drink ☐

d) 1 cup skim milk ☐

33. For a person in good control, what effect does exercise have on blood glucose?

a) lowers it ☐

b) raises it ☐

c) has no effect ☐

34. Infection is likely to cause:

a) an increase in blood glucose ☐

b) a decrease in blood glucose ☐

c) no change in blood glucose ☐

35. The best way to take care of your feet is to:

a) look at and wash them each day ☐
b) massage them with alcohol each day ☐
c) soak them for one hour each day ☐
d) buy shoes a larger size than normal ☐

36. Eating foods lower in fat decreases your risk for:

a) nerve disease ☐

b) kidney disease ☐

c) heart disease ☐

d) eye disease ☐

37. Numbness and tingling may be symptoms of:

a) kidney disease ☐

b) nerve disease ☐

c) eye disease ☐

d) liver disease ☐

38. Which of the following is usually not associated with diabetes:

a) vision problems ☐

b) kidney problems ☐

c) nerve problems ☐

d) lung problems ☐

39. Signs of ketoacidosis include:

a) shakiness ☐

b) sweating ☐

c) vomiting ☐

d) low blood glucose ☐

40. If you are sick with the flu, which of the following changes should you make?

a) take less insulin ☐

b) drink less liquids ☐

c) eat more proteins ☐

d) test for glucose and ketones more often ☐

41. If you have taken intermediate-acting insulin (NPH or Lente), you are most likely to have an insulin reaction in:

a) 1-3 hours ☐

b) 6-12 hours ☐

c) 12-15 hours ☐

d) more than 15 hours ☐

42. You realize just before lunch time that you forgot to take your insulin before breakfast. What should you do now?

a) skip lunch to lower you blood glucose ☐

b) take the insulin that you usually take at breakfast ☐

c) take twice as much insulin as you usually take at breakfast ☐

d) check your blood glucose level to decide how much insulin to take ☐

43. If you are beginning to have an insulin reaction, you should:

a) exercise ☐

b) lie down and rest ☐

c) drink some juice ☐

d) take regular insulin ☐

44. Low blood glucose may be caused by:

a) too much insulin ☐

b) too little insulin ☐

c) too much food ☐

d) too little exercise ☐

45. If you take your morning insulin but skip breakfast your blood glucose level will usually:

a) increase ☐

b) decrease ☐

c) remain the same ☐

46. High blood glucose may be caused by:

a) not enough insulin ☐

b) skipping meals ☐

c) delaying your snack ☐

d) large ketones in your urine ☐

47. Which one of the following will most likely cause an insulin reaction:

a) heavy exercise ☐

b) infection ☐

c) overeating ☐

d) not taking your insulin ☐

PART D – This section looks at some of the factors that may influence your involvement in patient education related to their diabetes condition.

The author of this survey would like to acknowledge Marcum et al (2002) for this part of their survey.

Please tick the box that best describes how you feel about your role in providing education to your patients with diabetes.

	Strongly Disagree	Disagree	Undecide	Agree	Strongly Agree
In general, I believe that:					
48. Patient teaching is a high priority in my nursing care	☐	☐	☐	☐	☐
49. The nurse should assume responsibility for coordinating patient teaching.	☐	☐	☐	☐	☐
50. Patient teaching should be an important part of every nurse's responsibility.	☐	☐	☐	☐	☐
51. Other disciplines need to be more involved in patient teaching.	☐	☐	☐	☐	☐
52. Patient teaching is an important part of nursing practice for me.	☐	☐	☐	☐	☐
53. My patients are being adequately taught.	☐	☐	☐	☐	☐
54. Patient teaching could be improved if there were workshops on specific knowledge needed to teach patients	☐	☐	☐	☐	☐
55. There should be in-services that review the teaching and learning techniques	☐	☐	☐	☐	☐
56. It would be helpful if patient teaching materials were kept in one central area.	☐	☐	☐	☐	☐
57. I often do informal patient teaching that I do not document.	☐	☐	☐	☐	☐
58. I often do formal patient teaching that I do not document.	☐	☐	☐	☐	☐
59. There is adequate time to do patient teaching.	☐	☐	☐	☐	☐
60. Lack of a private area to do patient teaching hampers patient teaching	☐	☐	☐	☐	☐
61. Lack of time is a factor why documentation of patient teaching is not done.	☐	☐	☐	☐	☐

62. List any other factors that you consider **restrict** you as a GPN in providing diabetes care and education

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

63. List any other factors that you consider **assist** you as a GPN in providing diabetes care and education

_____

_____

_____

_____

_____

_____

_____

_____

_____

_____

Thank you for taking the time to complete this questionnaire.

Please return it to Jennifer Nicholas in the FREEPOST envelope provided by 17 November.

![Curtin University of Technology logo]

Form C

Application for Approval of Research with Minimal Risk

Office Use Only: Date Added to Database: _____ Approval No: _____

This form should be completed by students/staff undertaking research involving humans with **minimal risk**, defined as "the probability and magnitude of harm or discomfort anticipated in the research are not greater in and of themselves than those ordinarily encountered in daily life". Research may not commence without written notification of approval. See over page for application guidelines.

SECTION 1 — TO BE COMPLETED BY APPLICANT

1. **Investigator Name(s)** _Jennifer NICHOLAS_ **Supervisor Name** (if applicable) _Karen Glaister &_
   Alan Tulloch.
   Phone: _08) 91927468_ **Wk:** _08) 91926311_ **Mb:** _0428404086._
   Email _nicholas888@optusnet.com.au_
   Mailing Address _P.O. Box 6132, BROOME, W.A. 6725_

2. **School or research group** _School of Nursing and Midwifery_

3. **Project Title** "_The roles and responsibilities of WA. General Practice Nurses_

4. **Plain English summary of project** (100 words or less) _in diabetes care and management._
   This will be a cross-sectional study. General Practice Nurses affiliated with a Division of General Practice will be sent a postal survey via project officer from their division. Data will be analyzed using SPSS.

5. **Aims of project** (100 words or less)
   This study aims to describe the scope of practice, of general practice nurses in W.A., in diabetes related care and determine factors that influence and impact on nurse initiated care delivery.

6. **Project Type** Funded research ☐ Unfunded research ☐
   ☑ Project as part of degree (e.g. Undergraduate, Honours, Coursework Master's degree)
   ☐ State which degree _Master of Nursing._

7. **Recruitment** Procedures follow guidelines as stated in the National Statement[1] .... ☑

8. **Participants** Describe the population from which participants/sample will be recruited:
   W.A. General Practice Nurses.

9. **Participant Data** identified ☐ OR de-identified (eg linked code) ☐ OR anonymous ☑

10. **Sources of Data** directly from individuals ☑ Curtin University data ☐ private organisation ☐
    government organisation ☐ other source ☐ _____

11. **Data Collection Method(s)** (e.g. observation, physical activity, interviews, survey) _Postal Survey_

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Curtin
University of Technology

Please confirm the following:

12. Privacy & Confidentiality ....

    i.   Data will be stored in a secure location (state where) *School of Nursing* ☑
    ii.   Data will be stored for 5 years .... *Curtin* ☑
    iii. Access to data will be restricted to student and supervisor .... ☑
    iv. Data will only be used for purposes as described in the Information sheet .... ☑
    v.   Data will only be published in the format as stated in the Information sheet .... ☑

13. Information Sheet

    i.   Participants will be given an information sheet[2] .... ☑
    ii.   Information sheet will contain all items listed on the attached guidelines .... ☑

    Attach written justification if an Information sheet is not being used .... ☐

14. Consent form
    i.   Consent form not required[3] .... ☑
    ii.   Participants sign a consent form .... ☐
    iii. Participants consent verbally .... ☐
    iv. Consent assumed if participants return a questionnaire .... ☑

15. Attachments   Research Methods & Ethical Issues .... ☑
                                Information Sheet .... ☑
                                  Consent form .... ☐
                                  Instrument (eg survey) .... ☑

Signature:_____ *J Nicholas. 26/05/06*

Supervisor Signature *(if applicable)* _____

Date:_____

Research involving humans

Research involving humans should always comply with current ethical standards. In Australia, the ethical standards for such research are set by the National Health and Medical Research Council (*the NHMRC*) *National Statement on Ethical Conduct in Research Involving Humans* and those proposing to carry out research should be familiar with publications of the NHMRC. See http://www7.health.gov.au/nhmrc/publications/

The aim of ethical review of human research is to ensure that participants in research are not put at risk of harm, are not disadvantaged and are made aware that they may withdraw without prejudice.

Broadly, the process of ethical review concentrates on three main areas:

A   Gathering informed consent to participate in research projects

B   Protection of privacy and confidentiality of records

C   Risk of harm to subjects or to groups in the community

In the following section you are asked to answer a number of questions under each of these three headings in order to identify any ethical considerations that may arise from your proposed research. Following this set of questions there is a further check list relating to types of research that have previously been identified as likely to raise ethical questions. In the second check list each of the types of research is cross referenced to a chapter of the NHMRC guidelines for you to read.

The following checklist is designed to alert you to the major types of ethical issues in your research. If you answer Yes to any of these questions, be sure to explain and clarify the issue elsewhere in the document.

Ethical Issues Checklist

A: Informed consent.

Research subjects must be able to give consent to their participation in research in such a way that ensures that they are fully informed of relevant aspects of the research and that they are confident to give consent for the research to be undertaken.

Researchers should ensure that individuals are not directly or indirectly pressured or coerced into participation through unequal power relationships or payments or inducements. The use of deception in any form in a research protocol has the potential to prevent the subject from giving consent that is truly well-informed.

Does your research involve: (please tick)

1	Processes that potentially exclude and/or disadvantage a person or group, such as the collection of information which may expose the person/group to discrimination or misrepresentation?	YES ☐ NO ☑
2	Collection or disclosure of personal information by a Commonwealth, State or Territory agency that might involve a breach of an Information Privacy Principle (as defined by the Commonwealth Privacy Act 1988 and the Australian Standard)?	YES ☐ NO ☑
3	Collection or disclosure of personal information by a private sector organisation [that might involve a breach of a National Privacy Principle (as defined by the Commonwealth Privacy Act 1988)]?	YES ☐ NO ☑
4	Payments or inducements, other than reasonable recompense, to participants for their participation?	YES ☐ NO ☑
5	Deception of the participants including concealment and covert observation?	YES ☐ NO ☑
6	Disclosure of the response outside the research which could place the participants at risk of criminal prosecution or civil liability or be damaging to their financial standing, employability, professional or personal relationships?	YES ☐ NO ☑
7	Any form of passive consent?	YES ☐ NO ☑

B: Risks to privacy and confidentiality.

The privacy of individuals and the confidentiality of data are both vital. The research must take special care to protect the privacy and confidentiality of subjects and the data obtained from them.

Does your research involve:

8	The participation of minors (under 18 years), other than in the observation of normal school activity?	YES ☐ NO ☑
9	Participants who are in a dependent situation, such as students or residents of an institution (such as a hospital, nursing home or prison or patients highly dependent on medical care), other than those who are being observed in their normal environment where such observation is considered innocuous?	YES ☐ NO ☑
10	Participants who may be unable to give or are incapable of giving informed consent?	YES ☐ NO ☑
11	The participation of Aboriginal or Torres Strait Islanders, or other peoples from identifiable cultural, ethnic or minority groups?	YES ☐ NO ☐
12	a) Acquisition of data about organisations or individuals through any form of database at any stage of the research? *Only total number of diabetic patients on database.*	YES ☑ NO ☐
	b) Organisations or individuals who are directly or indirectly identifiable by the researcher within the database?	YES ☐ NO ☑
13	Use of questionnaires or interviews which may be linked either directly (eg through recording of names) or indirectly (eg through a cross-linked code) to the individual/participant/researcher at any stage of the research, including the obtaining of data?	YES ☐ NO ☑
14	Use of questionnaires, interviews, or procedures, irrespective of the recording of the individual's identity, which might reasonably be expected to cause discomfort, embarrassment, or psychological or spiritual harm to the participants?	YES ☐ NO ☑

C: Is there a risk of harm to subjects or groups in the community?

Individuals may be put at risk through the use of new and untried procedures, invasive procedures, the administration of drugs, or the use of procedures likely to cause pain or suffering. Individuals and groups in the community may be also be harmed through damage to their cultural security or through processes which might expose them to discrimination or misrepresentation.

Does your research involve:

15	Any novel procedure in the therapy or management of patients in a clinical setting?	YES ☐ NO ☑
16	Any form of physically invasive procedure such as blood collection, exercise regimens or physical examination, and which is not part of clinical management?	YES ☐ NO ☑
17	Any form of physically invasive procedure on volunteer participants such as body fluid collection (eg blood, urine, semen), exercise regimens or physical examination?	YES ☐ NO ☑
18	The administration of any form of drug, medicine (other than in the course of standard medical procedure) or placebo?	YES ☐ NO ☑
19	Physical pain, beyond mild discomfort?	YES ☐ NO ☑
20	Obtaining and storage of blood, body fluid or tissue samples from the participants?	YES ☐ NO ☑
21	Any other ethical issue of the study which has not been addressed in this Checklist?	YES ☐ NO ☑
	If Yes, please indicate:	

FINAL CHECKLIST

As a final check, please respond to the following list of research areas that commonly raise ethical concerns. Research involving any of the categories listed below is subject to compliance with the provisions of the NH&MRC *National Statement on Ethical Conduct in Research Involving Humans*. If you answer Yes, or Probably, please ensure that you have explained and clarified each item elsewhere in the document and that you have both read the relevant chapter of the National Statement (http://www7.health.gov.au/nhmrc/publications/synopses/e35syn.htm) and addressed the specific considerations therein.

Does this proposal involve: -

Please tick answers to ALL questions

	YES	POSSIBLY	NO
1. minors i.e., under the age of 18 (chapter 4)?	☐	☐	☑
2. persons with an intellectual or mental impairment (chapter 5)?	☐	☐	☑
3. persons highly dependent on medical care (chapter 6)?	☐	☐	☑
4. persons in dependent or unequal relationships (chapter 7)?	☐	☐	☑
5. collectivities(such as other specified racial groups) (chapter 8)?*	☐	☐	☑
6. separate identification of, or focus on, Aboriginal and Torres Strait Islander peoples (chapter 9)?*	☐	☐	☑
7. ionising radiation (X-rays, fluoroscopy or radioisotopes) (chapter 10)?**	☐	☐	☑
8. assisted reproduction technology (chapter 11)?	☐	☐	☑
9. clinical trials (chapter 12)?	☐	☐	☑
10. innovative therapy or intervention (chapter 13)?	☐	☐	☑
11. epidemiological research (chapter 14)?	☐	☐	☑
12. use of human tissue samples (chapter 15)?	☐	☐	☑
13. human genetic research (chapter 16)?	☐	☐	☑

*If you answered yes to questions 5 or 6, have you consulted the Guidelines for Ethical Conduct in Aboriginal and Torres Strait Islander Health Research. (http://www.nhmrc.gov.au/publications/synopses/e52syn.htm) This provides good guidance on dealing with cultural groups and their sensitivities

YES ☐   NO ☐

**For research involving ionising radiation, microwaves, lasers or ultraviolet light, researchers must submit a separate application to the Radiation Safety Officer, for consideration of approval by the Radiation Safety Committee. Research cannot commence without such approval.*

Please indicate the National Statement chapters you have consulted.

For each item to which you have ticked **Yes** or **Possibly**, please state briefly how your research complies with the relevant section of the National Statement.

Investigator Signature:	*Nicholas. 07465912. (Jennifer Nicholas)*	Staff ID:	
Supervisor Signature:		Staff ID:	
Date:			

WAGP
Network

May 23, 2006

Dear Jennifer

I am writing to express the support of the WA GP Network Nursing in General Practice
network, of which 8 divisions responded, in assisting with the dissemination of a survey
to WA practice nurses in regard to your request.

Yolande Hatherley, from Kimberley Division of General Practice, has volunteered to
coordinate this process and we wish you well in compiling the survey as part of your
thesis work on 'The Role of the WA General Practice Nurse in Diabetes Education and
Management'.

Jennifer, acknowledgement of the Australian Department of Health and Ageing funding
and the WA Divisions of General Practice support to your project is expected.
I look forward to the outcome of your findings and subsequent presentation.

Kind regards

Christine Prosser
Nursing in General Practice Project Officer (interim)
WA GP Network

Christine

Cc: Yolande Hatherley, Kimberley Division of General Practice

Curtin
University of Technology

School of Nursing and Midwifery
Project Information Sheet

Project Title: The role of WA general practice nurses in diabetes care and management.

My name is Jennifer Nicholas; I am a Registered Nurse and Diabetes Educator. I am currently a Master of Diabetes Education student at Curtin University of technology.

As part of my thesis I am conducting a survey of the specific tasks, roles and responsibilities of WA practice nurses in diabetes related care. I will also gather information on their continuing professional development undertaken in this area and determine what influences practice nurse involvement in diabetes management.

More than one million Australians are estimated to have Diabetes. As one of our national health priorities there needs to be greater emphasis on health promotion and illness prevention related to diabetes within the primary health care setting. Nurses working in general practice are uniquely placed to contribute significantly towards the screening, education and good management of diabetes to minimize complications.

I would appreciate your assistance with my research. Information is not required from any patient database. All information will remain anonymous. The survey should only take about 15 minutes to complete.

If you have any enquires regarding this research please contact myself (Jennifer Nicholas on 0892521471/0428404086) or my supervisor (Karen Glaister, at the School of Nursing & Midwifery, Curtin University on 0892662201). Thank you for your participation in this project, it is greatly appreciated.

Jennifer Nicholas
RN, DE
(08 92521471 mob.0428404086))