



**KNOWLEDGE AND PRACTICES OF OCCUPATIONAL HEALTH NURSE  
PRACTITIONERS IN THE MANAGEMENT OF DIABETES MELLITUS IN SOUTH  
AFRICA**

**by**

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## DECLARATION

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M Pretorius

Signed

25 July 2014

Date

## ABSTRACT

Diabetes is one of the major non-communicable diseases in South Africa (SA) and in 2008, 6.4 percent of the South African population was reported by Frost and Sullivan to have diabetes (Business Wire, 2008). Furthermore, the prevalence of diabetes in South Africans between the ages of 20 and 70 had been predicted to rise from 3.4% to 3.9% by the year 2025 (Rheeder, 2006:20). There is no clear assessment of the amount of nursing care Occupational Health Nursing Practitioners (OHNPs) provide to diabetic employees in SA. From working experience of the researcher, employees with diabetes were absent from work more often due to poor glucose control than other workers with chronic health conditions. The increasing levels of absenteeism had financial impact on the diabetic employees, other workers, and industry. Therefore, OHNPs working in industries and organizations must have the appropriate knowledge to ensure that workers with diabetes are screened, monitored, and managed effectively in the workplace. **The aim of the study** is to assess the knowledge and practices of OHNPs in managing diabetes in workplaces in SA. **The objectives of the study** are firstly, to explore the extent of knowledge and practices of OHNPs regarding screening for diabetes in the workplace; secondly, to describe knowledge and practices of OHNPs regarding monitoring of diabetes in the workplace; and thirdly, to examine the knowledge and practices of OHNPs in management of diabetes in the workplace.

**Quantitative survey design** was selected to focus the study and inform on the data collection tool. The **population** was all the OHNPs that were members of the South African Society of Occupational Health Nurse Practitioners (SASOHN) and registered on the SASOHN database. SASOHN Executive Office granted permission for use of the database. Ethical approval for the study was obtained from the University Research and Ethics Committee. The sample included all the members of SASOHN that had access to emails. The researcher developed an electronic self-administered questionnaire based on the 2009 American Diabetic Association position statement. The questionnaire contained both closed and open-ended questions which were grouped under specific sections. The questionnaire was emailed to participants accompanied by an invitation to participate and an informed consent form. **Results:** due to the complexity of industries and factories that OHNPs are employed in, the organisations were divided into eight categories. About 45% of respondents rated their knowledge of diabetes management as either good or average, 55% rated their knowledge of screening as good, 44% rated their knowledge of diabetes management as good and only 7% as very good. Only 51% of OHNPs routinely screened workers for diabetes. The majority of the OHNPs indicated that the Fasting Blood Glucose (FBG) was the diagnostic test they used to diagnose diabetes, which is the preferred test. Between 73 - 85% of OHNPs indicated that each of the suggested five aspects of immediate care were performed after diagnosis **Conclusions:** OHNPs consider their knowledge on different

aspects of diabetes to be average to good, however, lack of knowledge on types of diabetes, and some gaps identified regarding the tests for screening and diagnosis of diabetes, are cause for concern. Most OHNPs that participated in the study use different approaches to conduct diabetes awareness initiatives to promote health amongst their employees. There is a gap in OHNPs' practice of screening for diabetes as well as in their knowledge. The lack of knowledge of the OHNPs that used the Oral Glucose Tolerance Test (OGTT) or other tests is cause for concern. Amongst most respondents the five aspects of care necessary after diagnosis of DM were performed. **Recommendations:** firstly, a strategy should be developed to encourage males to specialise in occupational health nursing. Secondly, a vigorous marketing strategy must be promoted to inform career guidance teachers on how to attract new applicants to the nursing profession and to promote nursing as a career of choice. Thirdly, the number of nurses trained in occupational health nursing and practising as OHNPs should be determined to assess professional developmental needs. Fourthly, additional research ought to be conducted to determine OHNPs' actual knowledge of crucial aspects of diabetes and diabetes management. A standard/guideline could be developed to ensure that OHNPs have points of reference, and continuous training and professional development programmes on screening and diagnosing of diabetes should be established. There must be an investigation into constraints that OHNPs are faced with when implementing health promotion in the workplace as well as to determine the impact of such health promotion initiatives on the employees. OHNPs should be informed about the immediate care that needs to be performed on diagnosis of diabetes to improve their knowledge base and to motivate them to change their practice to provide a solid basis for continuity of care and management of newly diagnosed clients. **Suggestions for further research:** research on the effect of screening programmes in the occupational health setting to diagnose diabetics and the follow up care that is given. More research is required on how much monitoring and supervision is being conducted by OHNPs in the workplace.

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## DEFINITION OF TERMS

<b>Term</b>	<b>Definition/Explanation</b>
<b>Client</b>	Person who is a walk-in patient at the workplace where they are employed, to whom the OHNP provides health care services
<b>Diabetes</b>	Refers to Type 2 diabetes mellitus which is a common metabolic disorder that is due to insulin deficiency or insufficiency that leads to hyperglycaemia (high blood glucose)
<b>Fasting Glucose</b>	A blood test done to determine the blood sugar level in a fasting state (not having eaten for 8-12 hours) (Farlex, 2011).
<b>Glucose</b>	A simple sugar produced when carbohydrates are broken down in the small intestine. It is the primary source of energy for the body. Various tests that measure blood glucose levels are used in diagnosing insulin resistance (Farlex, 2011).
<b>HbA1C</b>	The ratio of glycosylated haemoglobin in relation to the total haemoglobin in circulation. A test that measures the amount of haemoglobin bound to glucose. It is a measure of how much glucose has been in the blood during the past two to four months (Farlex, 2011).
<b>Hypertension</b>	Hypertension is also called high blood pressure. Blood pressure is the force of blood pushing against the walls of arteries as it flows through them. Arteries are the blood vessels that carry oxygenated blood from the heart to the body's tissues (Farlex, 2011).
<b>Impaired Glucose Tolerance</b>	A condition in which fasting plasma glucose levels are higher than normal but lower than those diagnostic of diabetes mellitus. In some patients this represents a stage in the natural history of diabetes. Also called impaired pre-diabetes (Farlex, 2011).
<b>Knowledge</b>	Theoretical or practical understanding of a subject; awareness or familiarity gained by experience (of a person, fact or thing) (Readers' Digest Oxford Complete Wordfinder, 1993: 845).
<b>Obesity</b>	Obesity is an abnormal accumulation of body fat, usually 20% or more over an individual's ideal body weight. Obesity is associated with increased risk of illness, disability, and death (Farlex, 2011).
<b>Occupational Health Nurse Practitioner</b>	Refers to a registered professional nurse that is a member of SASOHN and is practicing in an occupational health setting; whether they have an additional qualification in occupational health nursing, or not
<b>Oral Glucose Tolerance Test</b>	A test of the body's ability to utilize carbohydrate. It is performed by giving a standard dose of glucose solution and measuring the blood for glucose after two hours (Farlex, 2011).
<b>Practice</b>	Performance of a service or intervention
<b>South African Society of Occupational Health Nurse Practitioners</b>	A professional society dedicated to furthering the promotion of occupational health nursing and that has a database of members that are practicing in the occupational health field.
<b>Workplace</b>	Any place of work where a client and OHNP are employed

## LIST OF ABBREVIATIONS

ADA	American Diabetic Association
BMI	Body Mass Index
CDC	Center for Disease Control
CPD	Continual Professional Development
CHC	Community Health Centre
DDT	Division of Diabetes Translation
DOH	Department of Health
DSME	Diabetes Self-Management Education (DSME)
FBG	Fasting Blood Sugar
GP	General Practitioner
HDL	High Density Lipoproteins
IFG	Impaired Fasting Glucose
IGT	Impaired Glucose Tolerance
ILO	International Labour Office
LDL	Low Density Lipoproteins
NCD	Non-communicable diseases
OGTT	Oral Glucose Tolerance Test
OHC	Occupational Health Clinic
OHNP	Occupational Health Nurse Practitioner
OMP	Occupational Medical Practitioner
PHC	Primary Health Care
RSA	Republic of South Africa
SANC	South African Nursing Council
SASOHN	South African Society of Occupational Health Nurse Practitioners
WHO	World Health Organisation



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## **CHAPTER ONE: ORIENTATION TO THE STUDY**

### **1.1 Introduction**

This chapter provides the background and point of reference of the researcher, problem statement and research questions. The chapter also presents a conceptual model developed by the researcher to indicate relationships among variables of the study. The theoretical framework underpinning the study is presented and the aim and objectives of the study are also outlined. The chapter finally provides a brief outline of content of the remaining chapters of the thesis.

### **1.2 Background**

The researcher is a professional nurse who specialised in the field of occupational health nursing. She worked as an Occupational Health Nurse Practitioner (OHNP) for 15 years before being employed at a higher education institution in Cape Town. She is currently responsible for coordinating and lecturing on the degree programme for occupational health nursing students. During her practice as an OHNP, the researcher was employed in a variety of industries in KwaZulu Natal and the Western Cape provinces of Republic of South Africa (RSA). Initially this practice as an OHNP was basic primary care that included, amongst others, treatment of minor ailments and injuries at work, monitoring of chronic disease conditions and dispensing of relevant medication, and reproductive health as well as health and safety management. The researcher observed that the degree and types of health care offered to employees, differed from workplace to workplace.

Over a period of time, the researcher's practice changed to include more occupational health care. Additional training in occupational health nursing enabled the researcher to acquire increased awareness and knowledge of health needs of workers. Another reason that forced the researcher to prioritise the services that she would provide was the time constraints of only working part-time and having limited hours available to provide health care. The researcher also realised that there were few health facilities, specifically for occupational health care, available outside of employees' workplaces to assist with health issues related to their work. The public sector health facilities and/or employees' individual medical aids were able to provide the necessary primary care. However, the negative effects of exposure to risks at the workplace that were detrimental to employees' health were not being monitored on a regular basis.

Due to the reasons described above, the researcher's practice changed from delivering primary care to that of occupational health care. This occupational health care focused on risk assessment, medical surveillance, occupational health and safety as well as the

management of work-related injuries and disease conditions. The researcher's involvement with chronic illness monitoring was limited to random monitoring of blood pressure and blood glucose levels when required.

The reduced care given to employees with chronic illnesses, in particular diabetes resulted in the researcher being faced with new challenges. She also noted the burden the disease placed on both resources at her workplaces and employees. The impact of chronic illnesses decreased the quality of life of the employees including their socio-economic and psychosocial well-being. The researcher found that employees with diabetes were absent from work more often due either to illness, poor glucose control and/or having to visit their health care provider to obtain their diabetic medication or follow up care. Those employees not on medical aid attended the public health clinics but found those services were often overwhelmed with high patient loads.

The researcher observed that due to the high patient load at public health clinics, employees were absent from work for an entire day, and sometimes had to go back to the same clinic the following day for medication. The increasing levels of absenteeism had an adverse impact on both the employees and industry. Once employees' exceeded their permitted number of paid sick leave days, absence from work meant a day's salary was deducted from their salaries adding to their financial burdens. Other employees also felt more pressurised when required to fill in for absent colleagues, resulting in tension and poor interpersonal relationships between employees. The increased levels of absenteeism were also a financial drain on the employer's output due to loss in productivity as well as costs of sick leave benefits and health care payments.

Instead of addressing health care needs at the workplace, the researcher was forced to refer employees to other health care providers. Employees had to be referred to local Primary Health Care (PHC) centres e.g. Local clinics or Community Health Centres (CHCs) or use their personal medical aid schemes for all follow-up care and medication. Employees would often only consult with a doctor at the public health facilities every three months with little follow up care in between visits. The researcher found that the numbers of employees with diabetes were increasing. Employees whose diabetes was poorly managed were less productive at work and showed signs of stress and depression. A number of employees expressed the need for assistance and support with family and other social issues relating to their illness. In some cases, being less productive at work and increased absenteeism resulted in employees having to undergo disciplinary procedures, adding both financial and emotional burdens.

From the researcher's experience, another aspect is the health and safety risks associated with any workplace. For example, certain employment activities pose health risks to employees that have diabetes, namely working at heights and in shifts. Furthermore, employees with diabetes also have limitations with regard to certain jobs that they may perform, for example, driving vehicles. In her respective workplaces, the researcher identified employees that were working in high risk jobs, and had diabetes. Although she monitored their glucose levels, she was limited in the follow up care that could be provided to these employees. In addition, there were no plans in place to detect persons that were afflicted with diabetes but that had not yet been diagnosed as such. Employees with diabetes that experienced hypoglycaemia or hyperglycaemia were also at greater risk of injuries depending on the work they performed.

Besides the business-orientated focus of improved productivity and work outputs, the management of the health and safety of all persons working in industry is considered not only a legal but a moral obligation in the researcher's opinion. The Occupational Health and Safety Act, No 85 of 1993 (OHASA), Section 8, states that every employer shall endeavour to ensure that any working environment is safe and without risk to employees (Juta, 2010:11). With reference to the principles of corporate governance, organisations are obliged to implement risk management throughout their organisation (Steyn, 2004:483). Corporate governance has become a new focus for business (Isometrix, 2009). Laws relating to corporate governance were developed to encourage companies to "do the right thing"; as the potential exists for substantial financial losses related to quality, environmental, safety and health programmes (Isometrix, 2009).

It is the researcher's opinion, based on her personal experience and the literature reviewed, that the management of diabetes in the occupational health setting should be treated as a priority. Firstly, to alleviate the burden this disease places on employees with diabetes and the resources at the workplace. Secondly, to comply with legislation and corporate governance obligations by managing employees with diseases, like diabetes, that could pose health risks in the workplace. Thirdly, to fulfill one of the goals of occupational health nursing, i.e., to prevent or reduce illness, maintain and promote health (Acutt, 2011:16).

The OHNP is in the ideal situation to implement interventions and manage nursing care of employees. The researcher suggests that using the workplace and the OHNP for interventions targeting diabetes could assist the already over-burdened health sector. The workplace is an ideal setting for interventions targeting the adult population. It provides the opportunity to potentially reach a large number of individuals simultaneously and therefore impact positively on the health profile of these individuals. In addition to influencing health

and lifestyle behaviour, worksite interventions have been shown to play a key role in increasing productivity and decreasing healthcare costs (Kolbe-Alexander, Proper, Lambert, Van Wier, Pillay, Nossel, Adonis and Van Mechelen, 2012).

Oberlinner (2007:41) refers to Tuomilehto, Lindstrom, Eriksson et al. (2001:1343) who stated that earlier studies have shown that early detection of pre-diabetic workers and interventions with lifestyle changes can prevent or delay the onset of diabetes amongst high-risk adults. Therefore, concerted efforts must be made to implement and evaluate a diabetes risk reduction programme in the work place.

Based on reasons outlined above, the researcher felt that management of clients with diabetes in the workplace ought to be reviewed. This is especially important in the light of the burden of the increasing prevalence of diabetes globally and in South Africa. This burden of disease is impacting on the health services needed to treat and manage persons with diabetes.

The World Health Organisation (WHO) indicates that there are 220 million people with diabetes globally and that 3.4 million people died as a result of high blood glucose in 2004 (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>). In addition, more than 80% of deaths that are due to diabetes occur in low-and middle-income countries, which is of course applicable to South Africa (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>). According to a report by Frost and Sullivan, almost 6.4 per cent of the South African population was diabetic in 2008 (Business Wire, 2008: <http://www.allbusiness.com/health-care/>). Furthermore, the prevalence of diabetes in South Africans between the ages of 20 and 70 is predicted to rise from 3.4% to 3.9% by the year 2025 (Rheeder, 2006:20).

In addition, there are new challenges that have arisen which increase one of the dilemmas that all OHNPs face. This dilemma is that of meeting the primary care needs of employees versus ensuring that the priorities of occupational health care, to manage risks, are maintained. The South African National Department of Health has developed strategic plans that will be implemented over a five-year period (RSA, DOH, 2010). These include the implementation of a re-engineered primary health care system approach. The other pending plan is that of the National Health Insurance. OHNPs in practice will have to take these plans into account and adjust their services accordingly if they want to continue adding value to industry which is business-orientated. The researcher suggests that this will include a change of focus back to including more primary care again.

The researcher recognised that a gap existed in the nursing care provided to her employees with diabetes and felt that she could be managing these employees more extensively. She identified the need for a guideline with standards of care that she could base her practice on. Furthermore, the researcher recognised that to manage clients with diabetes in the workplace, the OHNP needed to have knowledge of the disease as well. The researcher felt that the OHNP's knowledge of the disease and recognised standards of care should be utilised in her practice. The researcher's stance is supported by the American Diabetes Association (ADA) Position Statement (2009) which indicates that the care of people with diabetes is complex and many issues, besides that of glycaemic control, need to be managed. Furthermore, standards of care should be used to manage diabetes holistically and to evaluate the quality of care given to people with diabetes (ADA, 2009).

### **1.3 Problem statement**

Oberlinner (2007:41) refers to Tuomilehto, Lindstrom, Eriksson et al. (2001:1343) who stated that earlier studies have shown that early detection of pre-diabetic workers and interventions with lifestyle changes can prevent or delay the onset of diabetes amongst high-risk adults. Therefore, concerted efforts must be made to implement and evaluate a diabetes risk reduction programme in the work place. Based on these reasons management of clients with diabetes in the workplace ought to be reviewed. In 2008, a report by Frost and Sullivan stated that almost 6.4 per cent of the South African population was diabetic (Business wire, 2008: <http://www.allbusiness.com/>) Furthermore, the prevalence of diabetes in South Africans between the ages of 20 and 70 had been predicted to rise from 3.4% to 3.9% by the year 2025 (Rheeder, 2006:20). This is especially important in the light of the burden of the increasing prevalence of diabetes both globally and in South Africa.

The researcher found that employees with diabetes were absent from work more often due to poor glucose control and/or having to visit their health care provider to obtain their diabetic medication or for follow up care. Due to the high patient load at public health clinics, employees were absent from work for an entire day, and sometimes had to go back to the same clinic the following day for medication. The increasing levels of absenteeism had an adverse impact on both the employees and industry. Once employees' exceeded their permitted number of paid sick leave days, absence from work meant a day's salary was deducted from their salaries adding to their financial burdens. The increased levels of absenteeism affect productivity and additional costs to employers that pay contributions towards workers' sick leave benefits and health care insurance. Co-workers also felt more pressurised when required to fill-in for absent colleagues, resulting in tension and poor interpersonal relationships between employees. Therefore, OHNPs working in industries and organizations must have the appropriate knowledge to be able to carry out their

professional duties to ensure that workers with diabetes are screened, monitored, and managed effectively in the workplace. There is an increasing burden of diabetes in the workplace. The extent of the knowledge and practices of OHNPs in managing diabetes in the workplace in South African is not known. Therefore the contribution that OHNPs bring to the management of diabetes in the workplace needs to be explored.

#### **1.4 Research questions**

- What is the extent of the knowledge of OHNPs regarding screening for diabetes in the workplace?
- In what ways do OHNPs practice screening for diabetes among workers in the workplace?
- How much knowledge do OHNPs have regarding monitoring of diabetes in the workplace?
- How do OHNPs monitor workers with diabetes in the workplace?
- How much knowledge do OHNPs have regarding management of diabetes in the workplace?
- What are some of the practices OHNPs undertake for managing diabetes among workers in the workplace?

#### **1.5 Conceptual model**

The model depicted in Figure 1.1 below was developed by the researcher. The model outlines relationships between the variables that will be addressed in the study.

##### **1.5.1 Description of the conceptual model**

The description of the conceptual model explains the variables that are depicted in Figure 1.1 and how the variables relate to each other. Central to this study are the OHNPs responsible for managing clients with diabetes in the workplace. There is a relationship between OHNPs and clients at the workplace. For example, employees depend on the OHNPs for health care support and the OHNPs provide health care services through the application of their professional knowledge and practice. The type of services provided depend on the hazards and risks that the clients are exposed to at the workplace. OHNPs utilise their knowledge and skills to implement interventions and manage the clients with diabetes at their workplaces. The management of diabetes refers to the four sections, namely prevention, by raising awareness of diabetes; screening to detect and diagnose diabetes; monitoring and supervision to reduce complications and provide follow up care; and management of continuity of care.

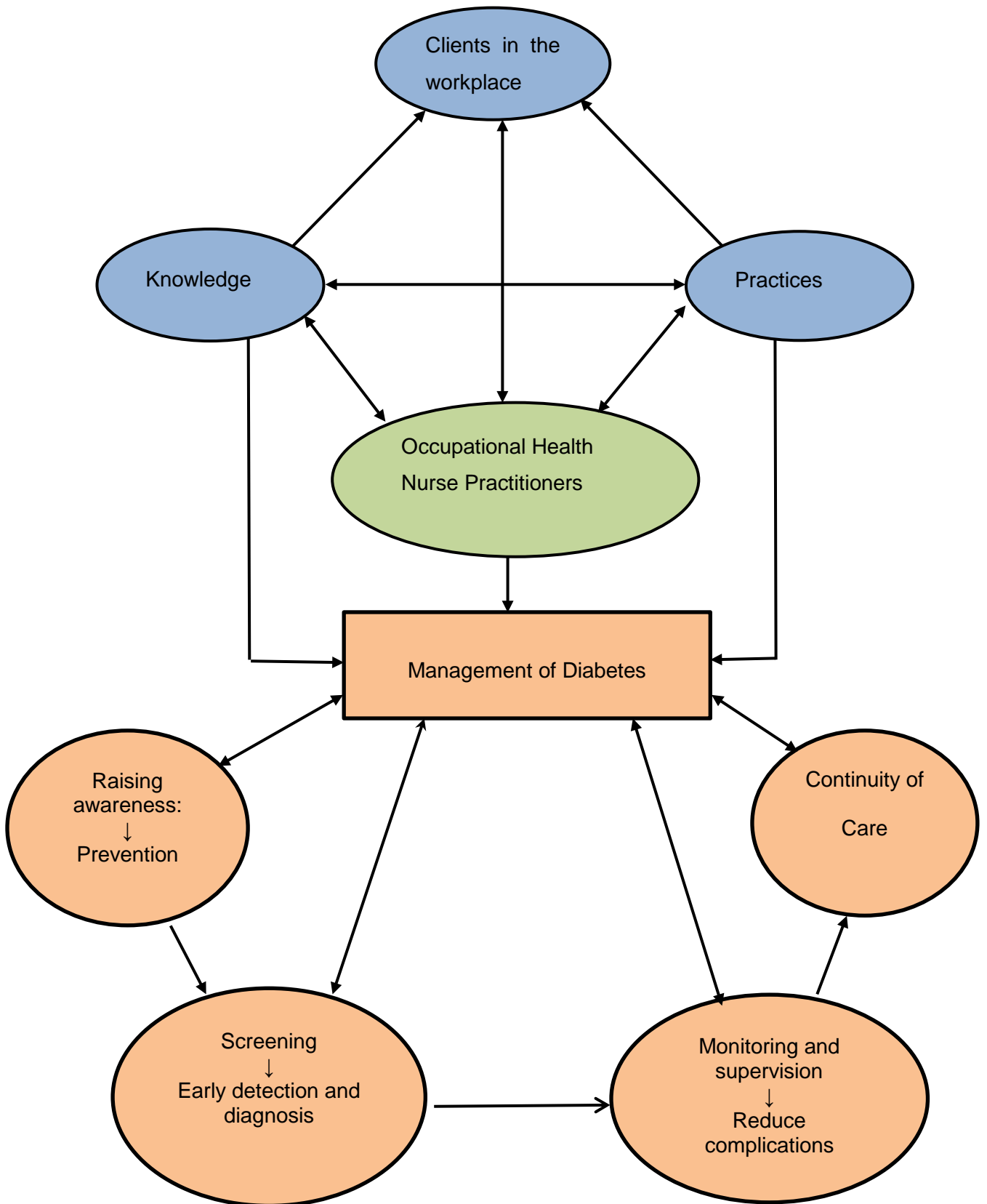


Figure 1.1: Conceptual model developed by the researcher.

## 1.6 Theoretical framework

According to a joint committee of the WHO and International Labour Office (ILO) the discipline of occupational health is concerned with: “the promotion and maintenance of the highest degree of physical, mental and social well-being of all workers in all occupations; the prevention of adverse health consequences for workers as a result of conditions in their workplaces; the protection of workers at risk because of existing factors in their places of employment; and the placement and maintenance of workers in occupational environments that have been adapted to suit their physiological and psychological conditions (Acutt, 2011:16).

The term ‘work’ refers to the effort, mental and physical, expended in exchange for remuneration (Acutt, 2011:28). Acutt (2011:29) defines an employee as a person, who offers services to another person or organisation (employer) according to a contract. Therefore, a workplace is “any place in which work is performed” (Acutt, 2011:37). An employee’s job performance is influenced by his/her physiological, sociological, and psychological abilities (Acutt, 2011:127).

Knowledge is “the awareness or familiarity gained by experience of a person, fact or thing” (Reader’s Digest Oxford Complete Wordfinder, 1993:844-845). Knowledge also includes “a theoretical or practical understanding of a subject, language, etc.” (Reader’s Digest Oxford Complete Wordfinder, 1993: 844-845). The ways of enquiring knowledge are through tradition, authority, logical reasoning, trial and error, intuition, borrowing, personal experience, and role-modeling and mentorship (Brink, 2006:4-7; Burns and Grove, 2009:10).

The Occupational Health Nurse is “a registered professional nurse who has acquired the specialized knowledge and skills that are needed to identify health risks in the workplace, to motivate both management and employees to create and maintain a safe and healthy work environment, and to prevent injuries and unwanted diseases and medical conditions from arising in the workplace” (Acutt, 2011:246). La Bar (1984), cited in Rogers (2003:570), defined the practice of nursing as: “the performance ..... of professional services requiring specialized knowledge of the biological, physical, behavioural, psychological and sociological sciences and nursing theory as the basis for assessment, diagnosis, planning, intervention and evaluation in the promotion and maintenance of health”.

OHNPs utilise their knowledge and skills in the practice of implementing interventions to promote health of and manage clients with diabetes at the workplace. The first step in the management of diabetes is to prevent the occurrence of diabetes in a workplace setting. This is best done through health promotion and health education. Health promotion refers to:



“The process of enabling people to increase control over and improve their health; to reach a state of complete physical, mental and social wellbeing, an individual or group must be able to identify and to realise aspirations, to satisfy needs and to change or cope with the environment” (WHO: 1986:iii-v).

According to the Ottawa Charter the OHNPs could enable, mediate and advocate for the fundamental conditions and resources needed to promote diabetes prevention in the workplace. Furthermore, if the OHNPs have knowledge and skills to manage diabetes in the workplace, they could create supportive environments, motivate for a policy for health promotion, empower the employees and re-orientate the health services in the Occupational Health setting. OHNPs could develop their own as well as the personal skills of employees to manage their own health, and cope with their chronic illness (WHO, 1986: iii–v).

Dorothea Orem’s nursing theory of self-care has relevance in the occupational health setting. Society values self-care and the activities of care given to others (Mashaba & Brink, 1994:91). The six interrelated care concepts provided in Orem’s conceptual framework are that of self-care, self-care agency, therapeutic self-care demand, self-care deficit, nursing agency and nursing systems. Self-care agency relates to the capacity the person has to take care of self; therapeutic self-care relates to all the actions needed and resources provided to meet the required self-care. Nursing agency refers to the nurse’s capabilities to identify the need for patient assistance while the nursing system refers to a series of actions performed by nurses in order to meet their therapeutic self-care demand or stimulate their self-care agency (Mashaba & Brink, 1994:92).

## **1.7 Aim and objectives of the study**

The aim of this research is to explore and describe the knowledge and practices of OHNPs in managing diabetes in workplaces in SA.

The objectives of this study are:

- To explore the extent of knowledge and practices of OHNPs regarding screening for diabetes in the workplace,
- To describe knowledge and practices of OHNPs regarding monitoring of diabetes in the workplace, and
- To examine the knowledge and practices of OHNPs in management of diabetes in the workplace.

## **1.8 Justification for the study**

It is the opinion of the researcher that OHNPs in RSA should play more of a role in managing diabetes in their respective workplaces. Furthermore, that the extent of knowledge and practices of these OHNPs in the management of diabetes in the workplace needs further investigation.

In the experience of the researcher, the degree to which OHNPs in SA are involved in the management of diabetes differs from practitioner to practitioner. The researcher wanted to ascertain how these OHNPs manage diabetes with reference to certain areas of nursing care. These areas of nursing care were derived from the personal experience and observation of the researcher and with reference to the ADA Position Statement (2009). This information could be used by OHNPs to identify gaps in their practice. Evidence was found of guidelines on the management of diabetes in primary health care settings. In the researcher's opinion, there was a paucity of literature to ascertain what guidelines and standards of care OHNPs in SA use to manage diabetes. The researcher hopes to obtain information about which guidelines and standards of care OHNPs are using to base their practice on, at the time of the study.

It is anticipated that the study will generate information on the knowledge and current practices of OHNPs in managing diabetes in occupational health settings in SA. Findings from the study could be used to develop specific guidelines for the management of diabetes in occupational health settings. These guidelines could provide OHNPs with the means and opportunity to improve their health care practices and/or policies thereby improving the health and wellbeing of employees in their workplaces.

The study should provide information on the extent to which OHNP's are managing diabetes as part of their service and what tools/strategies/guidelines they are using to base their practice on. The findings could be used to inform professionals and employers of the role of the OHNP and the need for wellness interventions, screening and monitoring of clients with diabetes and diabetes management programmes to lessen the burden of this disease and improve quality of care given to clients.

## **1.9 Layout of the thesis**

The rest of the thesis will present information as follows. Chapter two will include the literature review. Chapter three will describe and justify the research design and methodology used in this study, to explore and gain insight into the knowledge and practices of OHNPs in management of diabetes in the workplace. The chapter three presents the research design, population and sample of the study, method of data collection, validity and

reliability of instrument used, ethical considerations, data management, process of analysis, presentation of findings and constraints and limitations of the study. Chapter four will report on key results of the study relevant to the objectives. As indicated in the methodology, one thousand questionnaires were sent out. Only one hundred and thirty-four participants responded, of which one hundred and twenty-six were used in the analysis. Tables and charts will be used to depict responses and all information presented in inverted commas and italics was copied verbatim from responses received.

Chapter five will cover the interpretation and discussion of findings on demographics; organisations, employees and clients with diabetes; knowledge of OHNPs on diabetes and screening for diabetes in the workplace; practice of OHNPs of screening for diabetes in the workplace; practice of OHNPs of diagnosis and follow up of clients with diabetes in the workplace; monitoring and supervision of clients with diabetes in the workplace; provision of continuity of care for clients with diabetes in the workplace; and OHNPs' management of diabetes in the workplace.

Chapter six will deal with conclusions and recommendations and address how each objective has been achieved and the relationship of the findings to the conceptual framework. The chapter will also make some recommendations for new areas for further research.

## **CHAPTER TWO: LITERATURE REVIEW**

### **2.1 Introduction to the chapter**

This chapter will present the literature that was reviewed to provide a background for what is known about OHNPs and their management of diabetes in the workplace.

The chapter will discuss occupational health, the role and functions of the OHNP, and OHNP qualifications and management of diabetes. Information will be provided about diabetes the disease, the associated risk factors, the prevalence of diabetes and the economic burden of diabetes. The different approaches to managing diabetes in the workplace will be described including the screening, diagnosis, monitoring and follow up of clients with diabetes.

### **2.2 Occupational health**

Rantanen (1990:12), cited in Acutt (2011:17) stated that the WHO recognises the importance of occupational health services because they reach high-risk working populations and maximise preventative health services including the introduction of PHC services into the workplace.

An occupational health service should have a programme that is comprehensive and holistic enabling the OHNP to identify and describe the causes of work-related disease that include both physiological and psychosocial factors (Acutt, 2011:2).

According to Rantanen (1990:18) one of the goals developed by the WHO to assist occupational health programmes to meet the needs of employees, was the training and education of occupational health personnel, employees and employers (Acutt, 2011:17). Furthermore, the objectives of an occupational health service are expressed in the following five principles:

protection and prevention (protecting workers from health hazards at work); adaptive (adapting the working environment to the capabilities of workers); health promotion (concerned with promoting the physical and psychosocial well-being of workers); curative and rehabilitative (concerned with minimising the consequences of occupational hazards, accidents and injuries, as well as occupational and related disease); and primary healthcare (the provision of general healthcare services for workers and their families, in the workplace itself or in nearby facilities (Acutt, 2011:21).

“Occupational health nursing is a nursing specialty that provides healthcare for workers in workplaces ... and promotes worker health and protection within the context of a safe and healthy work environment” (Acutt, 2011:22).

### **2.3 Role and functions of OHNPs in organisations**

The duty of the OHNP is to protect the health of employees at their respective workplaces depending on the biochemical, physiological, social, emotional, and environmental hazards and risks these clients are exposed to (Michell: 2011:38). Furthermore, the range of services is dependent on the OHNP's workplace and employment agreements and differs from practitioner to practitioner.

The offering of primary health care in the workplace, including monitoring of chronic illnesses is one of the services offered in an OHC. The early detection and treatment of non-communicable diseases such as diabetes are of great importance and require regular monitoring and supervision, says Michell (2011:45). Furthermore, in industry, a client that is experiencing hypoglycaemia or hyperglycaemia could endanger the safety of other employees as well as his/herself.

The main focus of occupational health nursing, however, is the fitness for work assessments conducted during pre-placement, periodical, return to work, exit, and follow up medical examinations, which are conducted to ascertain the effects on and risks to employees' health resulting from exposure to hazards, materials and equipment at the workplace (Michell, 2011:42-45). The OHNP should also provide management with the information necessary to guide the organisation towards the management of occupational health issues (Michell, 2011:38).

Clients are the people employed in the workplace where the OHNP is a staff member that provides health care services, therefore this client is not a 'patient' as such but rather a worker who may be exposed to hazards that exist in the workplace (Acutt, 2011:22). One of the conclusions of the WHO global strategy for 2008-2017 is that occupational hazards, social and individual factors, and access to health services; influence the health of employees (Acutt, 2011:17). All employees have a contract with the employer and are entitled to utilise the OHNP's services therefore are seen as clients (Acutt, 2011:29). Every category of job held by the employees, from the executive management to the production floor, is considered a client of the OHNP. An OHNP's clients vary depending on their demographics, the type of industry they are employed in, type of work performed, the nature of the hazards and risks employees are exposed to (Acutt, 2011:259).

Employers are focused on business management, profits and costs to their bottom line. Productivity and work output are priorities. Employers are required to comply with legislation in maintaining a workplace that is safe and healthy for employees (Juta, 2010). Corporate governance principles with regard to risk management also demand moral obligations from the employer for the safety and health of employees (Steyn, 2004:483). Employers will make the final decision on what services an OHNP can and will provide taking into account health care costs versus benefits to health care and resources available.

Searle (1982: 515), cited in Acutt (2011:23), held the opinion that any condition that diminishes a worker's ability to produce at an optimal level undermines not only the worker and employer, but also the national welfare of the whole country. Furthermore, because of the rapid expansion of the South African economy and the relative shortage of skilled labour, the work of occupational health nurses is a matter of considerable economic significance to the community and to the country as a whole (Acutt, 2011:23).

#### **2.4 OHNP qualifications and demographics**

According to information provided by Michell (2011:22), the first course for the Certificate in Occupational Health was held in 1976 however, there was a lapse of 3 years before the next course. Between 1981 and 1984, a part-time course recognised by the South African Nursing Council (SANC) in terms of SANC Regulation R238 was offered however, recognition for registration of this course as an additional qualification was withdrawn by SANC (Michell, 2011:22). Thereafter, SANC only listed occupational health qualifications against the name of the successful candidates between 1984 to 1993.

In February 1993, SANC regulation R212 was promulgated, leading to registration of an advanced qualification in Occupational Health Nursing (Michell, 2011:21). According to Acutt (2011:24) and Michell (2011:22) both public and private sectors presently offer either a Diploma or Bachelor of Technology in Occupational Health Nursing depending on the institution and the duration of study. Furthermore, some leading South African universities offer a master of science and doctoral degrees in this speciality (Acutt, 2011:24). Michell (2011:22) raised the concern that there is at present no distance-based training for candidates that are either working or living in areas not serviced by a tertiary educational institution.

SANC is the only regulatory body that keeps registers of additional qualifications of nurses but there were no statistics on which of these were registered as occupational health nurses according to Michell (2011:22). Although the SANC listed the numbers of persons, with additional qualifications in occupational health nursing, on their register as at 31 December

2012 the numbers appear to be inaccurate in comparison to the members of the South African Society of Occupational Health Nurse Practitioners (SASOHN). The numbers given by the SANC are as follows: 293 females and 15 males, (SANC, n.d.: <http://www.sanc.co.za/stats>). Michell (2011:19) discussed SASOHN which is a professional society whose main aims are the promoting of occupational health in industry and to address the needs of the occupational health nurse. SASOHN is a national body with ten regions spread throughout the provinces of SA. She confirms that SASOHN had an active membership of more than 1200 and a total database of 2500 OHNPs in SA however it is not known if they have additional qualifications in occupational health nursing. The SANC also provided statistics on the geographical distribution of registered professional nurses in the provinces of RSA with a total of more than 124 000 professional nurses in 2012 (SANC, n.d.: <http://www.sanc.co.za/stats>). Furthermore, SANC provided the age distribution of registered professional nurses which indicated that 31% are between the ages of 50-59, 30% are between the ages of 40-49, and 13% are between the ages of 60-69. Only 19% were in the age group of 30-39 years (SANC, n.d.: <http://www.sanc.co.za/stats>).

According to Acutt (2011:275), the OHNP is regarded as an independent practitioner with specific roles and functions and works within a professional scope of practice (regulated by Nursing Act, no 33 of 2005). Furthermore, the act requires that the knowledge and skills of the OHNP should be kept up to date. OHNPs work alone and are often the sole providers of health care therefore are responsible for evaluating their own clinical performance and should arrange for the continuous updating of their knowledge and skills (Acutt, 2011:275). An OHNP, with a postgraduate qualification in occupational health, has the skills and knowledge to carry out the aims of protecting and promoting the health of employees in the workplace (Acutt, 2011:276).

OHNPs are employed in the public and private sector and at a variety of workplaces for example industries, mines, construction, banking and health services (Michell, 2011:39). Furthermore, the OHNP can be employed either as an independent practitioner, or as part of a professional occupational health outsourced service. SASOHN conducted a salary survey in 2007 which highlighted the types of employment status of an OHNP (Table 2.4a; SASOHN, 2007).

**Table 2.4a: Comparison of employment status**

Employment status	This study	SASOHN Salary Survey
Employed full time in an organisation	58%	69%
Employed through an employment agency	33%	19%
Self-employed	8%	12%

## **2.5 Management of diabetes**

Michell (2011:37) says that the aim of occupational health nursing is to secure the health, safety and wellbeing of the workforce, through the assessment, monitoring and promoting of the health status of the employees. Furthermore, the OHNP should promote a high degree of physical and mental health in an industrialised setting.

Management of diabetes by the OHNPs should address four critical areas namely screening which includes prevention by raising awareness of diabetes, and diagnosis of diabetes; monitoring and supervision, which includes follow up care; and management of continuity of care (ADA, 2009).

## **2.6 Diabetes mellitus**

This section will include a review of Diabetes Type 2 and the prevalence globally, in Sub-Saharan Africa and South Africa. A discussion of global concerns, the economic burden of Diabetes and risk factors will follow.

### **2.6.1 Diabetes Type 2**

As cited in Takroui (2007:1) Type 2 diabetes is a common metabolic disorder that is due to insulin deficiency or insufficiency that leads to hyperglycaemia (high blood glucose) (WHO study group: Technical report, 1985:9). The WHO (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>) states that hyperglycaemia can lead to serious damage to vital body systems over time; in particular the heart, nerves, eyes, kidneys and blood vessels. Impaired Glucose Tolerance (IGT) and Impaired Fasting Glucose (IFG) are found in the transition period from normal to the onset of diabetes and increase the risk of a person developing diabetes (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>).

Because of the complex nature of diabetes, many aspects have to be addressed besides that of glycaemic control. The ADA position statement provides an in-depth range of interventions required to improve diabetic outcomes (ADA, 2009). The WHO (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>) describes Type 2 diabetes as a disease that occurs when the pancreas does not produce enough insulin or when the insulin, that is produced, cannot be utilized by a person's body; and that insulin is a hormone that is responsible for regulating blood glucose levels. Furthermore, that Type 2 diabetes occurs when the beta cells do not produce enough insulin to meet the needs of the body or when the cells do not respond to the insulin. There are a number of factors that influence the prevalence of diabetes namely socioeconomic status, age, sex, genetic susceptibility, lifestyle and other environmental factors (WHO Factsheet, 2011: <http://www.who.int/>



mediacentre/factsheets/). Acute and chronic histopathological effects are caused by insulin impairment or a lack of insulin. Untreated or poorly controlled diabetes can cause dehydration due to osmotic diuresis as a sequence of glycosuria. Persons with diabetes can also develop neuropathy (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>).

Type 2 diabetes occurs when the beta cells do not produce enough insulin to meet the needs of the body or when the cells do not respond to the insulin. There are a number of health risk factors that predispose a person to developing Type 2 diabetes. These are:

- A family history of diabetes
- Race or ethnic background – Type 2 diabetes is more prevalent in Hispanics, Blacks, Native Americans and Asians
- Being overweight, defined as a body mass index greater than 25
- Hypertension
- Abnormal cholesterol levels
- History of gestational diabetes (Anon, Nursing update, 2009).

## **2.6.2 Prevalence**

It is important to quantify the prevalence of diabetes as well as the numbers of people affected by this disease in order to plan and allocate resources to combat the disease (Meetoo, McGovern and Safadi, 2007:1002). The prevalence globally, in Sub-Saharan Africa and in RSA will be raised in the discussion to follow.

### *2.6.2.1 Global prevalence*

Globally, the prevalence of diabetes is increasing dramatically. Key facts as stated by the WHO are that 220 million people have/suffer from diabetes worldwide and that approximately 3.4 million people died as a result of high blood glucose in 2004 (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>). In 2010, North America was found to have the highest regional prevalence followed by Eastern Mediterranean and Middle East and South Asia and, more than 80% of deaths that are due to diabetes occur in low-and middle-income countries, which is applicable to SA (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>). Furthermore, the WHO projects that the deaths due to diabetes will double between 2005 and 2030. Zimmet, Shaw and Alberti (2003: 693) refer to Zimmet, Alberti and Shaw (2001:783) who state that the number of people with diabetes will increase from 151 million globally in 2000 to 221 million by the year 2010 and to 300 million by 2025. They state that this rise is expected to be greatest in developing countries and these numbers will be matched if not exceeded by persons with IGT and IFG. Takrouri (2007:1) concurs that the prevalence of diabetes is on the rise and that, according to the WHO

(National Diabetes Data Group, 1979), there were more than 70 million people suffering from diabetes in developing countries. Furthermore, this rise in prevalence is attributed to urbanisation and socioeconomic developments which are associated with rapid changes in lifestyle. Therefore it is essential that countries assess the size of the problem and take the necessary steps to prevent, control and provide for appropriate care in diabetes, as stated in the WHO World health report (1997) (Takrouri, 2007:2).

#### *2.6.2.2 Diabetes in Sub-Saharan Africa*

Diabetes has also been found to be an increasing problem in sub-Saharan Africa, with Type 2 diabetes being the most prevalent; due to rising rates of obesity, physical inactivity and urbanization (Levitt, 2008:1). At the time of writing, Levitt (2008:1) stated the morbidity of diabetes was mainly due to micro vascular complications; previously, macrovascular complications were rare however, are now becoming more common especially in the urban setting. Due to changing demography, the total number of people with diabetes in this region is expected to grow; therefore a concerted multi-sectoral effort is needed to ensure improvement in the healthcare delivery (Levitt, 2008:1).

#### *2.6.2.3 Diabetes in South Africa*

Health24 (2006: <http://www.health24.com/media>) “posted” a brief by the Diabetes South Africa society which states that although there are almost 6.5 million people diagnosed with diabetes in SA, only 8000 are registered with them. The Business Wire (2008: <http://www.allbusiness.com/>) refers to a report by Frost and Sullivan: “Strategic Analysis of the South African Diabetes markets” that states almost 6.4 per cent of the South African population is diabetic. Furthermore, one of the reasons this figure is growing rapidly is due to the higher diagnosis rates noted as a result of easier access to healthcare, (Business Wire, 2008: <http://www.allbusiness.com/>). In SA, the prevalence of diabetes differs from province to province and within the respective population groups (Soita, 2009:10-11). According to Soita (2009:10-11), in a study done on the chronic diseases of lifestyle in RSA, the highest prevalence of diabetes was shown amongst the Asian Indian community which showed a prevalence of 8.5 % and 11.5% respectively for men and women. Furthermore, this was followed by the coloured community with a prevalence of 3.1% and 5.8% for men and women respectively. It was also observed that the prevalence was higher in the urban population rather than rural population. According to research conducted at Bellville South, in a mixed-ancestry population between the ages of 35 to 65, 12.8% of this population were newly diagnosed i.e. unaware that they had diabetes (Soita, 2009:36, 65). A significant number of the inhabitants were either civil servants employed in the public sector or retired civil servants. Sixty three (63) per cent of the population was classified as working class and involved in economic activities (Soita, 2009: 36, 65).

Over the last decade, profound changes in the quality, quantity and source of food consumed in many developing countries, combined with a decrease in the levels of physical activity (especially in the workplace), have led to a further increase in the prevalence of diabetes and its complications (Yach, Stuckler and Brownell, 2006:62). The present South African Minister of Health, Dr Aaron Motsoaledi warned "that unless South Africans, and even citizens across the world, change their unhealthy lifestyles, within a decade or two, global healthcare costs will spiral out of control" (Child, 2012: <http://www.timeslive.co.za>). Urbanisation and demographic and epidemiological transitions have contributed to diabetes being one of the major non-communicable diseases in RSA (Matsha, Hassan, Kidd and Erasmus, 2012:5).

### **2.6.3 Global concerns**

In 2006, diabetes was recognized as a chronic, debilitating and costly disease by the United Nations and is considered such a threat that 14 November was designated as World Diabetes Day to raise awareness of this growing problem (Anon, Nursing update, 2009:60). The National Diabetes Fact Sheet discusses the number of Americans affected by diabetes (Centers for Disease Control and Prevention, 2011:1). The estimates are as follows: diabetes affects 25.8 million people, of which 18.8 have been diagnosed with diabetes while there are approximately 79 million adults aged 20 years or older with pre-diabetes. Shaw, Sicree and Zimmet (2010:5) describe diabetes as one of the most common chronic diseases in a large number of countries. Changes in peoples' lifestyles have led to reduced physical activity and obesity, so the numbers in and significance of diabetes has increased.

Shaw et al. (2010:9) also highlight the point that there are marked differences between developed and developing countries, with developing countries showing up to 49% more of an increase than developed countries. By 2030 there will be a slight increase in the numbers of people with diabetes in the 60-79 year age group while currently people in the age group 40-59 are the greatest number of people with diabetes worldwide (Shaw et al., 2010:9-10). They conclude that the prevalence is increasing as a consequence of the incidence increasing and as a result of better health care leading to the improvement of people's longevity in developing countries. The increase in incidence they attributed to demographic changes e.g. ageing as well as the increase in undesirable risk factors, namely obesity and sedentary lifestyles (Shaw et al., 2010:10). Meeto, McGovern and Safadi (2007:1003) refer to Zimmet (1995) and Zimmet (1999) who discuss the impact of the expansion of 'fast food' chains that introduce Western foods that have dubious nutritional value; and that "Western lifestyle diseases like non-communicable diseases, hypertension and diabetes are now an epidemic".

Bradshaw, Groenewald, Laubscher, Nannan, Nojilana, Norman, Pieterse, Schneider, Bourne, Timaeus, Dorrington and Johnson (2003:683) state that many developing nations, including South Africa have a dual burden of disease with non-communicable diseases (NCD), accounting for more than a third (37%) of all deaths. The other major causes of death are HIV/AIDS (30%) and other communicable diseases (21%) (Bradshaw et al., 2003:683). In addition to the increasing prevalence of NCD mortality and morbidity, with diabetes there is a concomitant increase in the prevalence of contributing risk factors such as physical inactivity and obesity (Kolbe- Alexander et al., 2012). The global rise of obesity has serious health consequences. The global raised Body mass index (BMI) is an established risk factor for diseases such as type 2 diabetes, cardiovascular disease and many cancers (Swinburn, Sacks, Hall, McPherson, Finegood, Moodie and Gortmaker, 2011:805).

#### **2.6.4 Economic burden of diabetes**

Diabetes and the complications thereof, has a huge impact on the health care of the persons concerned as well as an economic cost due to healthcare costs and loss of productivity (Meetoo et al., 2007:1003). Meetoo et al. (2007:1003) continue by saying that these healthcare costs are spent on treating the disease and its complications, related social service costs, loss of productivity and the effects of premature morbidity and mortality. Due to these human and economic expenses and consequences, it is necessary for all stakeholders to take swift action to curb the incidence of diabetes by reducing levels of the related risk factors (Meetoo et al., 2007: 1004).

Physical inactivity and unhealthy diet have been identified as the primary drivers for the increasing incidence of obesity, but these behavioural risk factors are themselves manifestations of changing social and economic conditions write Yach et al. (2006:63). Over the past few decades, five developments have tipped the balance between caloric intake and expense to an unfavourable equilibrium: 1) Expanding labour market opportunities for women; 2) increased consumption of food away from home; 3) rising cost of healthy foods relative to unhealthy foods 4) growing quantity of caloric intake with declining overall food prices and 5) decreased requirements of occupational (worksite) and environmental physical activity (Yach et al., 2006:63). Preferences, willpower and even genetics cannot explain the increase in the prevalence of obesity over time. Rather the changing incentives that individuals face have conditioned unhealthy choices to become the economically smarter choices (Yach et al., 2006:63).

Yach et al. (2006: 63) cite Cutler, Glaesar and Shapiro (2003) who write that the global emergence of obesity and diabetes is as much an economic issue as it is a health issue. Furthermore, in developing countries, where resources for dealing with clinical problems like

diabetes are scarce, aging and urbanization are adding to the burden of disease (Shaw et al., 2010:11). Mayosi, Fisher, Lalloo, Sitas, Tollman and Bradshaw (2009: 935) write that increased pressure is being placed on acute and chronic healthcare services due to the emergence of non-communicable diseases, of which diabetes is one, in both rural and urban areas. The concern is that the increasing emergence is most predominant in poor people that are living in urban settings (Mayosi et al., 2009:935).

The WHO (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>) says that the economic impact that diabetes has on individuals, families, health systems and countries, is significant e.g. China that will lose \$558 billion of their national income because of heart disease, stroke and diabetes alone. The burden of disease can be reduced by prevention, diagnosis and treatment, and other cost saving interventions as identified by the WHO (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets/>).

Sturm (2002), cited in Yach et al. (2006: 63) stated that, in the US over a period of five years, the medical cost due to diabetes more than doubled, jumping from \$44 billion to \$92 billion. Yach et al. (2006:63) continue that, despite this expenditure on resources, individuals are only receiving a fraction of the preventative and chronic care they need. At least 7% of the diabetes related hospitalization could have been avoided (Niefeld, Saudek, Braunstein, Weller, Wu and Anderson, 2003:1347). Although the diabetes epidemic in developing countries is still in its early phases, the economic burden has already become very important (Barcelo', Aedo, Rajpathak and Robles, 2003:25). It is estimated nearly one out of every three hospital bed-days in South America are occupied by diabetes related causes with an average cost/year at \$550/person, exceeding most per capita gross domestic product health expenditure (Barcelo' et al., 2003:25). Empirical evidence indicates that the full cost of diabetes accrued to society: 1) through lower returns on education 2) decreased household wages, earning and income; 3) increased premature retirement and unemployment and higher dependence on welfare. Over time, these indirect impacts can be more costly than the condition itself (Yach et al., 2006:64).

Mackintosh (2003:14) writes that many sub-Saharan African countries created government primary care provision as a key political element of nation-building; the organisation and scope of this publicly funded sector is now at issue, in all these countries. Most, especially low income African countries have seen the rise of informal charging in government health care, coinciding with economic crisis and austerity measures and a resultant severe fiscal squeeze on public sector wages and supplies (Mackintosh, 2003:14). Furthermore, the subsequent introduction of official fees for access to government primary care has interacted in complex ways with existing informal charges, and many public sector health workers also

work informally in the private sector. The implication is that the population in low income countries now are generally faced with heavy out-of-pocket spending for health care, whether for public sector fees (formal and informal) or access to private providers and commercial medicines (Mackintosh, 2003:15). For diabetic patients in India, 15-25% of household income is required to cover treatment cost (Shobhana, Rao, Lavanya, Williams, Vijay and Ramachandran, 2000:39). In Tanzania, the cost amounts to 25% of the minimum wage or 20 times the per capita health expenditure (Neuhann, Warter-Neuhann, Lyaruu and Msuya, 2002:512). This burden is often the greatest for individuals who are least able to afford it, leading to greater poverty and widening the gap between rich and poor. Consequently, in developing countries people with diabetes often experience financial difficulties and many avoid treatment altogether because of financial constraints. Even when families can afford insulin, it's often not available at the clinic (Barcelo´ et al., 2003:25).

Sturm (2002), cited by Yach et al. (2006:64) said that, concerned by the growing health and financial burdens amenable to primary and secondary prevention approaches, advocacy groups have begun to call for vigorous public policy intervention for obesity and diabetes. Business and large corporations are also increasingly becoming aware of the rewards that arise from investing in the health of their employees. Pfizer® as an example has taken the lead to integrate workplace health promotion into its human resource strategy (Yach et al., 2006:65). As companies take advantage of the business case of these programmes, a savings of R30 for every R10 invested on average, employee health will improve (Yach et al., 2006:65).

The rapidly increasing rate of DM, amongst both the inhabitants of the developed and developing world is a worldwide phenomenon (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>). Projected increases in the global prevalence of type 2 diabetes suggest that its treatment and prevention could become one of the major health challenges of the 21<sup>st</sup> century according to Zimmet, Alberti, and Shaw (2001: 782) as cited by Zimmet et al. (2003:693).

### **2.6.5 Risk factors**

Bradshaw, Norman, Pieterse and Levitt (2007:704) write that it is quite possible to reduce the burden of disease due to diabetes in South Africa, if risk factors are identified and treated early. There are unequivocal data that public health interventions can have a considerable impact on outcome in persons with diabetes (Bradshaw et al., 2007:704). Type 2 diabetes most frequently occurs in people who present with one or more of its risk factors (Nathan, Buse, Mayer, Davidson, Ferrannini, Holman, Sherwin and Zinman, 2009:5). Levitt (1999:947) discussed a study done to investigate the prevalence of Type 2 diabetes

and its modifiable risk factors in a working class peri-urban community. This community had not been studied before and was found to have an intermediate prevalence according to the International scale of Type 2 diabetes and that this prevalence was linked to potentially modifiable risk factors. If risk factors can be reduced, the incidence of diabetes can be reduced. The risk factors included the following: upper segment fat distribution and physical inactivity (Levitt, 1999:949).

#### *2.6.5.1 Family history of diabetes*

One risk factor for developing diabetes is a family predisposition (Beers, Fletcher, Jones, Porter, Berkwits and Kaplan, 2003:26). Therefore it is important to take a family history to identify risks. A family history of premature cardiovascular disease in male relatives less than 55 years and female relatives less than 65 years indicates risk (Pudifin, Boon, Sinxadi and Jamaloodien, 2008: 50).

#### *2.6.5.2 Age and Race*

Age is another risk factor, with the risk increasing with age. Diabetes is more prevalent in middle-aged adults after the age of 45 (ADA, 2009). In diabetes age is also a risk factor for cardiovascular diseases and includes men over 55 years and women over 65 years (Pudifin et al., 2008:50). Type 2 diabetes is more prevalent in persons of African, Hispanic, Native American, Asian, or Pacific Islander descent. African-American and Hispanics in the United States have a two-fold to three-fold increased risk of diabetes (Beers et al., 2003:962). In a 10-year follow-up study conducted by Motala, Pirie, Gouws, Amod and Omar (2002:23) the authors concluded that there is a high incidence of Type 2 diabetes in South African Indians. The predictors that were considered significant were a higher baseline blood glucose, BMI and obesity.

#### *2.6.5.3 Obesity*

Obesity is a major risk factor for developing DM. About 80-90% of people with diabetes are obese (Beers et al., 2003:962). Central obesity refers to the waist circumference (Pudifin et al., 2008:50). A waist circumference of less than 88cm in women and 102cm in men should be aimed at (Pudifin et al., 2008:144). Being overweight is defined as a BMI greater than 25kg/m<sup>2</sup>. Therefore the ideal weight should be maintained at a BMI of less than 25kg/m<sup>2</sup>. Overweight and obesity has been likened to diabetes what tobacco is to lung cancer. Roughly 50% of all cases of diabetes can be directly attributed to weight gain (Yach et al., 2006:62).

#### *2.6.5.4 Sedentary lifestyles*

Reduced physical activity, especially in the workplace, has also been a risk factor for diabetes (Yach et al., 2006:63). Sedentary lifestyles are associated with urbanization in

developed countries (Shaw et al., 2010:10) and one needs to look at minimizing these detriments of urbanization through specific lifestyle intervention programmes. Regular exercise is advocated e.g. moderate exercise of 30 minutes brisk walking 3-5 times per week (Pudifin et al., 2008:146, 50). There are unequivocal data that public health interventions can have a considerable impact on outcome in persons with diabetes (Bradshaw et al., 2007:704). Interventions aimed at reductions in inactivity may be two-times more cost effective than interventions aimed at other cardiovascular risks such as hypertension, smoking and hypercholesterolaemia (CDC, 2911: <http://www.cdc.gov/diabetes>).

#### *2.6.5.5 Diet*

Pudifin et al. (2008:154) state that eating the correct food is an important part of the management of diabetes. A diet rich in vegetables and fruits, low fat dairy products, a reduction in total fat and saturated fat intake is advocated and preference should be given to fish than red meat, and an increase in fibre and whole wheat bread or cereals (Pudifin et al., 2008:145). Furthermore, sweets and sugary foods as well as foods high in cholesterol should be avoided.

#### *2.6.5.6 Hypertension*

The risk of cardiovascular disease in patients with hypertension is increased in the presence of diabetes (Pein, Truscott, Buchmann, Strätling and Prangle, 2010:71). Hypertension is a condition characterised by an elevation of blood pressure above normal. The blood pressure should be measured on three occasions, a minimum of two days apart. However, if the blood pressure is severely elevated, a measurement of three readings should be taken at the first visit to confirm hypertension (Pudifin et al., 2008:61). Blood pressure is confirmed when the systolic pressure is  $\geq$  than 140mm/Hg and/or the diastolic pressure is  $\geq$  than 90mm/Hg (Pudifin et al., 2008:61). General measures to reduce hypertension require lifestyle modification such as weight loss if needed, regular physical exercise, cessation of smoking, reduction or moderate alcohol intake, restricted salt intake and a diet with adequate intake of fibre, fruit, vegetables and unrefined carbohydrates (Pudifin et al., 2008:62).

#### *2.6.5.7 Abnormal cholesterol levels*

Abnormal cholesterol levels refers to dyslipidaemia i.e. a total cholesterol of  $>6.5$ mmol/L in women or Low Density Lipids (LDL)  $>4$ mmol/L or High density Lipids (HDL) of  $<1$ mmol/L In men and  $1.2$ mmol/L in women (Pudifin et al., 2008:122). Food high in cholesterol includes egg yolks, tripe, caviar, fish roe, calamari and prawns (Pudifin et al., 2008:155).



#### *2.6.5.8 History of gestational diabetes*

Gestational diabetes refers to diabetes that occurs during pregnancy for the first time or diabetes that occurred during a previous pregnancy (Pein et al., 2010:334). The effects of diabetes in pregnancy increase the risk of intra-uterine death, very large babies, and neonatal complication such as jaundice, respiratory distress and hypoglycaemia. Furthermore it increases the risk of pre-eclampsia and congenital abnormalities (Pein et al., 2010:335).

#### *2.5.6.9 Impaired glucose tolerance or impaired fasting glucose;*

According to Erasmus (2010:26), in a study conducted in Bellville South, 19% of the subjects were at risk of developing diabetes due to impaired glucose tolerance and this study showed that there has been an increase of 10.4% in the prevalence of diabetes in this population since a study done 15 years ago. In addition, not much attention has been given to undiagnosed diabetes and impaired glucose homeostasis (i.e. pre-diabetes) in young and middle-aged individuals. In a recent German study, in young and middle-aged individuals, a high prevalence of a pre-diabetic state was found (Meisinger, Strassburger, Heier, Thorandt, Baumeistert, Giani and Rathmann, 2010:362). Pre-diabetes was shown to be an important risk factor for manifestation of diabetes and additionally for cardiovascular disease (Nathan, Henry, Davidson, Pratley, DeFronzo, Zinman and Heine, 2007:754-755).

#### *2.5.6.10 cardiovascular diseases*

Cardiovascular disease (CVD) is the leading cause of death in individuals with Type 2 diabetes and accounts for more than 50% of all deaths among diabetic individuals (Hu et al., 2002:1129). In South Africa, CVD is the second leading cause of death after HIV/AIDS (Bradshaw, 2003: 684 and the South African National Department of Health has identified diabetes as a major risk factor for increased mortality and morbidity (Bradshaw et al., 2007:701).

#### *2.5.6.11 Stress*

Generally, psychosocial stress has also been identified as a risk factor for poorer control of diabetes according to Chida and Hammer (2008::2175), even though the evidence is as yet not conclusive and more investigation needs to be done (Li, Jarczok, Loerbroks, Schollgen, Siegrist, Bosch, Wilson, Mauss and Fischer, 2012). Nevertheless, psychosocial stress can be considered a by-product of exposure to a stressor. Thus, several factors are relevant to stress responses, including cognitive appraisals, behavioural coping and the use of social support (Brosschot, Gerin and Thayer, 2006:122; Chida and Hamer, 2008:2169). Accordingly, several psychosocial categories have been defined: (1) stressful events (e.g. life events, job stress, severe chronic stress and daily stress); (2) stress-prone personality or

coping style (e.g. avoidant coping, denial coping, neuroticism, hopelessness); and (3) poor social support (e.g. poor social participation, poor stable partnership, poor family contact, loneliness) (Chida and Hamer, 2008:2169). Nevertheless, the causal relations between stress, particularly psychosocial stress in the workplace, and CVD are well established (Backé, Seidler, Latza, Rossnagel, & Schumann, 2012:75). Data from studies done on German industrial workers found that work stress is associated with impaired heart rate variability and cortisol/dehydroepiandrosterone sulphate ratio, indicating perturbations of the hypothalamic-pituitary-adrenal axis and the autonomic nervous system; these neuroendocrine systems profoundly regulate glucose uptake, release and storage (Gadinger, Loerbroks, Schneider, Thayer and Fischer, 2011:1).

Repeated or continuous activation of these systems during stress, which can be characterized as a paradoxical state of high metabolic activity without the corresponding metabolic needs, may predispose to the development of diabetes (Balanos, Phillips and Frenneaux, 2010:105). A significant association has also been shown between smoking, physical inactivity and abdominal obesity and stress (Siegrist and Rödel, 2006:479). It is quite possible to reduce the burden of disease due to diabetes in South Africa, if risk factors are identified and treated early (Bradshaw et al., 2007:704). There are unequivocal data that public health interventions can have a considerable impact on outcomes in persons with diabetes (Bradshaw et al., 2007:704).

## **2.6 Diabetes in the workplace**

The place of work has been identified as a setting that can potentially reach a large number of individuals simultaneously and impact positively on the health profile of these individuals and therefore is an opportune setting for interventions targeting the adult population (Kolbe-Alexander et al., 2012). In addition to influencing health and lifestyle behaviour, these worksite interventions have been shown to play a key role in increasing productivity and decreasing healthcare costs.

Oberlinner (2007:41) refers to Tuomilehto, Lindstrom, Eriksson et al. (2001:1343) who stated that earlier studies have shown that early detection of pre-diabetic workers and interventions with lifestyle changes can prevent or delay the onset of diabetes amongst high-risk adults. Therefore, concerted efforts must be made to implement and evaluate a diabetes risk reduction programme in the work place.

Kolbe-Alexander et al., (2012) refer to Botes and Otto (2003) who state that the focus of recent workplace based health research in RSA has predominately centred on HIV/AIDS and hazardous occupational exposure. Consequently there is a paucity of data on the

effectiveness of intervention programmes aimed at increasing physical activity, reducing obesity and thereby improving the cardiovascular and diabetes risk profile of the South African workforce (Kolbe-Alexander et al., 2012). In addition, there is at present limited data on the economic benefit of work place intervention programmes which focus on health and lifestyle behaviour change for South African companies (Kolbe-Alexander et al., 2012). They reiterate that concerted efforts must therefore be made to implement and evaluate a diabetes risk reduction programme in the work place.

Due to younger people being affected, diabetes is likely to become more important an issue in the workplace setting due to the increasing numbers of persons affected with the disease according to Marinescu (2007:75). Furthermore, due to workers' ages increasing, a greater burden of disease is being felt by workplaces, leading to health professionals and corporate changing their focus from providing health care to improving the health status of their employees. The promotion of health and prevention of injury and disease are being included more and more as elements of work-related benefits (Marinescu, 2007:75). Quinn and Richlin (2003:55-56) refer to Pinhas-Hamiel (1996) and Rosenbloom (1999) who state that more, younger people are being affected by Type 2 diabetes and that Type 2 diabetes, that is normally associated with older adults, is becoming increasingly common in children, adolescents and young adults.

Diabetes can affect the employment status of the affected individual in a number of ways (Tuncelli, Williams, Bradley, Pladevall, Nerenz and Lafata, 2005:2662). Firstly, complications due to diabetes may entirely prevent individuals from working or result in an increased absenteeism for those who work; Secondly, productivity while at work may also be impaired (Lavigne, Phelps, Mushlin and Lednar, 2003:1124). Thirdly, individuals with diabetes may face employment discrimination. In some cases, especially because of the risk of hypoglycaemia, employers may restrict access to the jobs designated as safety sensitive or discriminate against individuals with diabetes because of their concerns about low productivity (Matsushima, Yokoyama, Tajima, Ikeda, Agata and Isogai, 1993:825).

## **2.7 Approaches to managing diabetes in the workplace**

### **2.7.1 Health Promotion**

A number of studies have indicated that the risk of diabetes can be reduced through workplace wellness programmes that target diabetes prevention as well as other health improvement strategies and in so doing prevent/reduce future losses in employment and work productivity (Tuncelli et al., 2005:2666). In order to prevent cardiovascular disease and diabetes, lifestyle behaviour changes are of utmost importance (Robroek, Bredt and Burdorf,

2007:2). Worksites have specific features that make them a promising place for health promotion and diabetes screening (Robroek et al., 2007:2). Furthermore worksites offer an efficient structure to reach large groups, enable the introduction of social support and make use of a natural social network for peer support (Robroek et al., 2007:2).

Mayosi et al. (2009:939) write that if measures are not implemented to curb this trend, the burden of disease related to non-communicable diseases is predicted to increase substantially. They state further that the second most important cause of death in adult South Africans is due to heart disease, diabetes and stroke. Because diabetes is one of the 'burden of diseases' in South Africa, primary prevention of this disease is required, through the implementation of multi-level interventions and improved management at the primary health care level, state Bradshaw et al. (2007:705).

### **2.7.2 Primary prevention**

According to Beers et al. (2003:28), in primary prevention the disease is stopped before it manifests. Furthermore, primary prevention includes the reduction or elimination of risk factors. The implementation of employee wellbeing interventions that address the health risks of chronic diseases of lifestyle will assist in ensuring optimum productivity and creativity as well as high morale and increased health amongst employees (Health Stress Management, n.d.: <http://www.healthstresswellness.com/>). Risk factors have been addressed under the heading 2.6.5.

### **2.7.3 Secondary prevention**

In secondary prevention the disease is detected early and this occurs often before the symptoms are present (Beers et al., 2003:28). Screening for diabetes allows for early detection of the disease and is discussed under the heading 2.9. According to Quinn and Richlin (2003:55-56) the role of the Occupational Health Nurse in the prevention and treatment of diabetes should be seriously considered as an important goal in the workplace setting in the prevention of diabetes amongst employees. The dual purpose of treating individuals suffering with diabetes and preventing the development of diabetes in those individuals at risk will be greatly assisted by programmes that are geared towards improving diet and increasing physical activity (Quinn and Richlin, 2003:55-56).

### **2.7.4 Tertiary prevention**

Tertiary prevention involves the management of an existing disease to prevent further functional loss (Beers et al., 2003: 28). Employees that have diabetes experience a lower quality of life and increased absenteeism is reported according to DeCoste and Scott (2004:344). It is therefore of utmost importance that systems be put in place at the

workplace to support employees in adopting behaviours that promote effective diabetes control, seeing as they spend a large amount of their time in the workplace (DeCoste and Scott, 2004; 344).

The active involvement of patients in the management of their disease in order to prevent complications should be promoted (Quinn and Richlin, 2003:57). These patients need to monitor their blood glucose, blood pressure and lipid levels, and it is essential that the ability to monitor these is available in the workplace (Quinn and Richlin, 2003:57). DeCoste and Scott (2004; 344) recognize the key role that occupational health nurses play in advocating for a workplace that is supportive of diabetes self-management behaviours.

According to Quinn and Richlin (2003:57), both clients and the OHNP need to work together to determine causes of problems like sustained hyperglycaemia and frequent hypoglycaemia. Furthermore, clients also need assistance in the planning of administration of medications, especially those that are taken with or after meals. Quinn and Richlin (2003:57) suggest that clients, especially those on insulin, are presented with various challenges when placed on shift work, therefore a detailed examination of and preparation for mealtimes and snacks is required both at work and home. Quinn and Richlin (2003:57) conclude that OHNPs have the opportunity to promote optimal management of diabetes in the workplace so as to prevent complications. Akinci, Healey and Coyne (2003:489) also found that both the incidence of diabetes and long-term complications could be reduced through the implementation of effective diabetes education and patient self-management programmes. Besides assisting workers to remain productive, this intensive management of diabetes can decrease the costs related to complications as well as reducing associated costs for overtime (Akinci et al., 2003:489).

To improve the control of diabetes and reduce the frequency of its chronic complications, patient education must form an integral part of healthcare offered (Norris, Lau, Smith, Schmid and Engelgay, 2002:1168). Account should also be taken of the biological, emotional, and socio-familial aspects of each diabetic case, such as the structure and organization of the patient's family and his or her decision-making capacity; this global approach to the problem is known as comprehensive care (Norris et al., 2002: 1168). Without the provision of comprehensive care, adequate and stable control for the patient will not be achieved.

## **2.8 Screening for diabetes**

According to a review by the Centres for Disease Control and Prevention's (CDC) Division of Diabetes Translation (DDT), diabetes control programmes should be working with managed

health care organizations to consider opportunistic diabetes screening as a potentially valuable measure for certain subpopulations and minorities (CDC, 2011: <http://www.cdc.gov/diabetes>).

Early detection and prompt treatment may reduce the complications and burden of this disease (ADA, n.d.: <http://care.diabetesjournals.org>). Although there have been no randomized clinical trials to determine the effectiveness of screening programmes in decreasing the mortality and morbidity from diabetes, there is sufficient indirect evidence to justify opportunistic screening in a clinical setting of individuals at high risk and that clinicians should be vigilant in evaluating clinical presentations suggestive of diabetes (ADA, n.d.: <http://care.diabetesjournals.org>).

The ADA states that diabetes is often asymptomatic in its early stages and may remain undetected for many years, therefore screening for early detection and prompt treatment of this disease may reduce the burden of diabetes and its complications, therefore screening for diabetes may be appropriate under certain circumstances (ADA, n.d.: <http://care.diabetesjournals.org>). The CDC's DDT carried out a review of the scientific evidence and policy implications for screening for undiagnosed diabetes. Although the study concluded that population-based and selective programmes have uniformly demonstrated low yield and poor follow up, periodic screening of high-risk individuals as part of ongoing medical care, may be warranted (CDC, 2011: <http://www.cdc.gov/diabetes>). Furthermore, clinicians should maintain a high index of suspicion and pursue diagnostic testing for those people showing signs or symptoms that suggest diabetes. In conclusion this review stated that diabetes control programmes and managed health organizations should be working together and should consider "opportunistic diabetes screening as a potentially valuable measure for certain subpopulations and minorities", (CDC, 2011: <http://www.cdc.gov/diabetes>).

Clinicians should be vigilant in evaluating clinical presentations suggestive of diabetes (ADA, 2009; CDC, 2011: <http://www.cdc.gov/diabetes>). The ADA presented a position statement for screening in which they state that the greater the number of risk factors in an individual, the greater the chance is of that person developing diabetes (CDC, 2001: <http://www.cdc.gov/diabetes>). The ADA position statement (2009) distinguishes between diagnostic testing and screening. Diagnostic tests are performed on individuals who already exhibit signs or symptoms of diabetes, while screening is used to identify asymptomatic individuals that are likely to have diabetes. If a screening test is positive, diagnostic tests using standard criteria are then used to establish a definitive diagnosis (CDC, 2011: <http://www.cdc.gov/diabetes>).

Diabetes as a condition satisfies 4 of the 7 conditions considered appropriate to necessitate screening according to the ADA (CDC, 2011: <http://www.cdc.gov/diabetes>). Furthermore, the ADA states that some controversy exists regarding the cost-effectiveness of screening. Although community screening programmes may provide a means to enhance public awareness of the seriousness of diabetes and its complications, based on the lack of scientific evidence, the ADA states that community screening for diabetes is not recommended. However, the ADA concurs that there is sufficient indirect evidence to justify the implementation of opportunistic screening of individuals at high risk, in a clinical setting (CDC, 2011: <http://www.cdc.gov/diabetes>).

The ADA (2009) recommends that the decision to test for diabetes should be based on clinical judgment and patient preference. Therefore, health care providers should consider screening individuals at 3-year intervals beginning at age 45, especially in cases where the BMI > 25 kg/m<sup>2</sup> (ADA, 2009). Furthermore, in those individuals that are overweight and have one or more of the risk factors indicated in section 2.6.5, testing should either be considered at a younger age or be carried out more frequently. The ADA states that the best screening test for diabetes is the Fasting Blood Glucose (FBG) (CDC, 2011: <http://www.cdc.gov/diabetes>); Pudifin et al., 2008:145). A very important aspect of screening is that the test results be provided to the patient and that follow-up evaluation and treatment are available (CDC, 2001: <http://www.cdc.gov/diabetes>). The ADA (2009:94-95) lists the criteria for diagnosing diabetes as well as the health risk factors that predispose a person to developing Type 2 diabetes.

Type 2 diabetes can be preceded by one of two glucose metabolism disorders, namely IGT or IFG according to Erasmus (2010:25). Furthermore, IGT and IFG are referred to as “pre-diabetes” and are measured by the Oral Glucose Tolerance Test (OGTT) and FBG respectively. The FBG is currently the preferred test to diagnose diabetes but the HbA1C test could also be used (ADA, 2009: 4).

## **2.9 Diagnosis of diabetes**

According to O’Shea (2010) the signs and symptoms of diabetes are the following

- Increased thirst,
- Needing to pass urine all the time, especially at night,
- Extreme tiredness,
- Weight loss,
- Blurred vision,
- Genital itching or regular episodes of thrush, and
- Slow healing of wounds.

Although both the FBG and the 75g OGTT are suitable tests for diagnosing diabetes, the FBG is preferred for clinical settings due to it being easier and faster to perform and convenient as well as being acceptable to patients and less expensive (<http://care.diabetesjournals.org>).

The classification of diabetes and associated categories of glucose intolerance according to the WHO working group on random serum glucose are:

- Group 1: no diabetes <5.5mmol/l
- Group 2: diabetes >11.1mmol/l
- Group 3: borderline glucose intolerance test (GTT) 5.5 – 11.1mmol/l (Takrouri, 2007).

Table 2.9a indicates the blood glucose levels used in the diagnosis of diabetes according to O'Shea (2010).

**Table 2.9a: Blood glucose levels used in the diagnosis of diabetes**

<b>Blood glucose</b>	<b>Diagnosis</b>
Fasting: >7mmol/l	Diabetes
Random: >11.1mmol/l	Recheck
Fasting: 6-7mmol/l	Impaired fasting glucose. WHO recommends that these individuals should also have an oral glucose tolerance test (OGTT)
Fasting: <7mmol/l	Impaired glucose tolerance
With 2h OGTT Result 7.8-11.1mmol/l	Impaired glucose tolerance. WHO recommends that these individuals should also have a FBG test

Fasting is defined as “no consumption of food or beverage other than water for at least 8 hours before testing” (CDC, 2011: <http://www.cdc.gov/diabetes>; ADA, 2009).

The criteria for diagnosing diabetes are as follows:

1. FPG greater than or equal to 126 mg/dl (7.0 mmol/l) OR
2. Symptoms of hyperglycaemia and a casual (random) plasma glucose greater than or equal to 200 mg/dl (11.1 mmol/l) OR
3. Two-hour plasma glucose greater than or equal to 200 mg/dl (11.1 mmol/l) during an OGTT (ADA, 2009).

## **2.10 Monitoring of potential complications**

O'Shea (2010) warns that monitoring is important to reduce complications as late detection of diabetes can mean that damage has already occurred to the eyes, kidneys and nerves by the time that diagnosis is made, therefore early diagnosis and treatment of diabetes is essential. Furthermore, this early diagnosis and treatment will help to reduce complications



by improving glycaemic control as well as reducing the risk of associated heart disease due to the improvement of blood pressure and lipids. Although diabetes cannot be cured, O'Shea (2012) reiterates that it can be successfully treated by keeping blood glucose levels as normal as possible and by controlling symptoms so as to prevent complications later in life. Quinn and Richlin (2003:57) proposed that OHNPs have the opportunity to promote optimal management of diabetes in the workplace so as to prevent complications because diabetes remains a chronic disease that is associated with both microvascular and macrovascular complications, despite major treatment. These microvascular complications include retinopathy, neuropathy and nephropathy while the macrovascular complications are cardiovascular and peripheral vascular diseases (Quinn and Richlin, 2003:57).

Quinn and Richlin (2003: 55) refer to two studies that were conducted by firstly the Diabetes Control and Complications Trial as conducted by the DCCT Research group in 1993, and secondly the United Kingdom Prospective Diabetes Study that was carried out by the UKPDS in 1998. The changes in diabetes treatment and management that have occurred over the past twenty years have been influenced by the two studies mentioned whose results provided evidence that microvascular complications can be prevented or delayed by maintaining a normal blood glucose. Secondly, the studies also found that the macrovascular complications most likely result from the interactions between hyperglycaemia, hypertension and dyslipidaemia. Hence the treatment for diabetes focuses on maintaining normal blood glucose, blood pressure and lipid levels (Quinn and Richlin, 2003: 55).

The WHO defines the complications of diabetes as follows (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>). People with diabetes are at a greater risk of cardiovascular disease as 50% of people die from, primarily, heart disease and stroke. Due to reduced blood flow and neuropathy in the feet, people with diabetes have an increased chance of developing lower limb ulcers and this can lead to amputation (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>). People may also experience tingling, pain, numbness or weakness in the hands and feet due to diabetic neuropathy. Blindness, due to diabetic retinopathy can occur in 2% of people that have had diabetes for 15 years or longer of which 10% develop severe visual impairment. Death due to kidney failure occurs in 10-20% of people with diabetes. People with diabetes have an overall risk of dying which is double that of their peers who do not have diabetes (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>).

The risk of developing complications can be reduced by the implementation of the interventions as outlined in the ADA position statement (2009). These include the following:

- controlling a moderate blood glucose,
- controlling blood pressure,
- foot care,
- screening for retinopathy,
- controlling blood lipids, and
- screening for early signs of diabetes-related kidney disease (WHO Factsheet, 2011: <http://www.who.int/mediacentre/factsheets>).

Quinn and Richlin (2003:57) proposed that OHNPs have the opportunity to promote optimal management of diabetes in the workplace so as to prevent complications. Akinci et al. (2003:489) also found that both the incidence of diabetes and long-term complications could be reduced through the implementation of effective diabetes education and patient self-management programmes. According to them, besides assisting workers to remain productive, this intensive management of diabetes can decrease the costs related to complications as well as reducing associated costs for overtime. According to a study done by Aldana, Barlow, Smith, Yanowitz, Adams, Loveday, Arbuckle and LaMonte (2005: 499) of a Diabetes Prevention Programme implemented in a workplace setting, occupational health professionals can successfully offer a Diabetes Prevention Programme with existing worksite health promotion, to assist employees in improving their glucose tolerance.

A study was conducted by Gill, Price, Shandut, Dedicoatt and Wilkinson (2008:606) to set up and evaluate a nurse-led protocol and education-based system in rural KwaZulu Natal in South Africa. The results indicated that there were excellent medium-term improvements and the service was very well received. The authors concluded that nurses could successfully introduce and run such a system in a rural area Gill et al. (2008:606).

## **2.11 Follow-up of diabetic clients**

According to the ADA, numerous interventions need to be implemented to follow up people with diabetes. The final intervention that should be implemented in the comprehensive management of patients with diabetes is that of follow up (ADA, 2009). This is necessary to keep glucose within normal limits, ensure treatment compliance, ensure follow up and treatment of coexisting diseases like high cholesterol and/or hypertension, prevent complications, educate patients on lifestyle modifications and motivate patients on the self-management of their disease so as to improve their quality of life.

Young (2010: 45) refers to diabetes as a chronic but manageable condition that is optimally managed by major changes in lifestyle; however, it can be very difficult to motivate patients to change their behaviour. He explains that the three approaches that can be used to

motivate a patient to make these behavioural changes are the informative, directive and the prescriptive approaches. In addition, a very different approach is that of motivational interviewing and this approach has been used to address many lifestyle and/or behavioural issues such as diabetes (Young, 2010).

First in the follow up care of a diabetic, HbA1C testing should be performed as per recommended regimes, which are:

- at least twice a year for patients that have stable glycaemic control, and
- quarterly for patients whose therapy has changed or who are not meeting glycaemic controls (ADA, 2009). The goal for the test is to reach a level of less than 7%, as this has been shown to reduce microvascular and neuropathic complications for Type 2 diabetes (ADA, 2009).

Programmes on exercise, nutrition and precautions for people on blood sugar lowering medication, to prevent hypoglycaemia, should be given to all people with Type 2 diabetes (O'Shea, 2010:7). All programmes to manage diabetes comprehensively should include diabetes self-management education (DSME) and the assessment of psychosocial-related issues as emotional well-being is strongly related to positive diabetes outcomes (ADA, 2009).

The ADA (2009) poses that hypertension and dyslipidaemia are co-existing diseases with diabetes and need to be monitored on an ongoing basis. A patient's blood pressure should be tested at every routine visit and hypertensive treatment should be initiated if the systolic blood pressure is greater than or equal to 130 mmHg or the diastolic blood pressure is greater than or equal to 80 mmHg according to the ADA (2009).

To assess for dyslipidaemia, fasting lipid profiles should be tested annually and the values should be as follows: LDL cholesterol less than 100 mg/dl; HDL cholesterol greater than 40 mg/dl in males and greater than 50 mg/dl in females; and triglycerides less than 150 mg/dl. If these values are normal, lipid assessments may be repeated every two years thereafter (ADA, 2009). Screening for nephropathy, retinopathy and neuropathy should be undertaken at diagnosis of diabetes and thereafter at least annually (ADA, 2009). General foot care education should be given to all patients with Type 2 diabetes and an annual comprehensive foot examination should be conducted (ADA, 2009).

Vrijhoef, Diederiks, Spreeuwenberg, Wolffenbuttel and van Wilderen (2002: 441) evaluated the effects of a shared care model, where the diabetes nurse was the main care-giver, on patient outcomes in a primary care setting. The results of the shared care model were improved glycaemic control and additional consultations and other outcomes were found to

be equivalent to those before the introduction of the model, where the general practitioner was the main care provider. The author concluded that it seems justified to assign the care of persons with Type 2 diabetes to diabetic nurse specialists, which an OHNP could become.

## **2.12 Summary**

The literature review discussed occupational health, the role and functions of the OHNP, OHNP qualifications and management of diabetes. Information was provided about diabetes the disease, the associated risk factors, the prevalence of diabetes and the economic burden of diabetes. The different approaches to managing diabetes in the workplace were described including the screening, diagnosis, monitoring and follow up of clients with diabetes.

## CHAPTER THREE: RESEARCH METHODOLOGY

### 3.1 Introduction to chapter

The purpose of this chapter is to describe and justify the research design and methodology used in this study, to explore and gain insight into the knowledge and practices of OHNPs in management of diabetes in the workplace. The chapter presents the research design, population and sample of the study, method of data collection, validity and reliability of the instrument used, ethical considerations, data management, process of analysis, presentation of findings and constraints and limitations of the study. In conclusion, a summary of the chapter will be given.

### 3.2 Research design

A quantitative survey design incorporating a descriptive and exploratory approach was selected to focus the study. Mouton (2001:55) defines a research design as a plan or blueprint of how a researcher intends to conduct the study. Explanations will follow of nursing research, quantitative research, and descriptive and exploratory research designs.

Brink (2006:2) stresses the importance of research for a profession such as nursing because scientific knowledge provides the foundation on which professionals can base their practice. Ottenbacher (1990) as quoted in Brink (2006:2), states that “in a true profession, the skills come from a clearly defined and well-developed knowledge base, generated largely by members of the discipline”. The definitions of the term ‘research’ found in literature vary widely. Some of the common characteristics of research that are described are as follows: “Research is a scientific process that implies a systematic, controlled, diligent, critical and accurate approach is used; Research refers to an enquiry, exploration, discovery or investigation of natural and/or unexplained phenomena; and The aim of research is to discover new, or collate old, facts and relationships; reach new or revise accepted conclusions, theories or laws; validate existing knowledge and generate new knowledge. (Brink, 2006:2-3; Burns and Grove, 2009:2; De Vos, Strydom, Fouche and Delport, 2002:45)

Brink (2006:50-55) discusses the four interactive phases that form the framework for the research process as follows:

- Conceptual phase i.e. the ‘planning’ phase, where the research problem is identified, developed and refined, and the research approach/method and design are determined.
- Empirical phase i.e. the ‘doing’ phase, where the plans made in phase one are implemented and includes the collection of data.

- Interpretive phase, where the evidence i.e. data is analysed and conclusions are made to make sense of the results.
- Communication phase, the writing of the report, where the researcher communicates and disseminates the results of the study to appropriate audiences.

Quantitative research, as opposed to qualitative research, has its roots in a branch of philosophy called logical positivism which is based on the universal laws of logic, truth and predictions (Burns and Grove, 2009:22; De Vos et al., 2002:79). According to Burns and Grove (2009:22), “quantitative research is a formal, objective, systematic process in which numerical data is used to obtain information about the world”. They further indicate that quantitative research describes variables and the relationships between them as well as determining any cause and effect interactions between the variables.

Quantitative research focuses on the aspects of human behaviour that are measurable, using deductive reasoning writes Brink (2006:11). Furthermore, that structured procedures and formal instruments are used to collect the required information which is analysed with statistical procedures. Both Brink (2006:11) and Burns and Grove (2009:22, 35) emphasise that the researcher should be objective in the collection and analysis of information and use control to limit the effects of extraneous variables. Mouton (2001:56) further distinguishes between a research design and research methodology. A research design has as its focus the end result of the study, uses the research problem as the point of departure and focuses on the evidence required to address the research problem.

Descriptive studies provide the researcher with an opportunity to discover new information and/or describe what already exists on the characteristics of an individual, situation or group. This type of study will also allow the researcher to determine how often i.e. the frequency with which, something occurs and to categorise this information (Burns and Grove, 2009:25). Brink (2006:102-103) writes that a descriptive design is classified as a non-experimental quantitative research design which describes the variables needed to answer a research question without establishing any cause-effect relationship. Descriptive designs focus on collecting information from a sample that is representative of the population, using structured observation, questionnaires and interviews or survey studies (Brink, 2006: 102-103).

Bless and Higson-Smith (1995) cited in De Vos et al. (2002:109) explain exploratory research is conducted when insight into a situation, phenomenon, individual or community is needed. This need could arise either as a result of a lack of basic information on the area of interest or to collect information on a situation in order to formulate a research problem/hypothesis (De Vos et al., 2002:109). Burns and Grove (2009:359) further explain

that exploratory research facilitates an increase in knowledge of the field of study but is not intended for generalization to large populations.

De Vos et al. (2002:109) write that although descriptive and exploratory research is similar in nature, there are also differences. According to Neuman in De Vos et al. (2002:22), descriptive research focuses on “how” and “why” questions to present an accurate picture of the specific details around a situation, social setting or relationship. On the other hand, in exploratory research basic facts are gathered to create a general picture of conditions being studied.

Mouton (2001:113) writes that descriptive findings can be used to present evidence of interesting/significant patterns and trends in both existing and new data. As descriptive research presents an opportunity to study a phenomenon about which little is known, it provides the basis for further correlational, quasi-experimental and experimental studies (Burns and Grove, 2009:25).

### **3.3 Population and sample**

#### **3.3.1 Population**

The population was all the OHNPs that were members of SASOHN and registered on the SASOHN database at the time of the study. The database was obtained from SASOHN Executive Office. SASOHN had ten groupings called ‘regions’ (<http://www.sasohn.co.za>). These regions are spread throughout South Africa. However, the eleventh region is considered a ‘discussion group’. The regions are named as follow: Eastern Cape, Western Cape, Mpumalanga, Pretoria, Gauteng Central, West Rand, Vaal, Port Natal, Northern Natal, and Natal Inland (<http://www.sasohn.co.za>). The discussion group was situated in the Border area of the Eastern Cape (<http://www.sasohn.co.za>). The SASOHN database, which is not stable over a given year, was divided according to these regions and consists of approximately 3000 members. Of these some 1200 nurses are active members according to Michell (2011:22). The SASOHN database was used as it is the only database in SA known to the researcher that lists nurses working in the occupational health field, in a variety of organisations.

#### **3.3.2 Sample and sampling procedures**

In order to generate sample size, email invitations to participate letters were sent to all registered members of SASOHN. Furthermore, permission was sought from SASOHN to access the database (See Appendix A). Permission was granted by the SASOHN Executive

Office (see Appendix B). The sample included all member of SASOHN who had access to emails. In total, 1000 questionnaires were successfully emailed (See section 3.4.1).

### **3.3.3 Inclusion criteria**

- All nurses working as OHNPs in South Africa will be included
- All OHNPs who are also members of SASOHN will be included
- All SASOHN members with access to electronic emails will be included.

### **3.3.4 Exclusion criteria**

- All OHNPs who are not working in Occupational health
- All OHNPs who were not members of SASOHN
- OHNPs that were members of SASOHN but did not have access to electronic communication facilities (emails).

## **3.4 Methodology**

This subsection describes the questionnaire development, piloting of questions, and development of the final questionnaire.

### **3.4.1 Method of data collection**

Only one data collection method in the form of a confidential questionnaire was used in this study for ease of access to participants and 1000 emails were sent.

#### *3.4.1.1 Data collection tool*

De Vos et al. (2002:172) refer to the *New dictionary of social work* (1995:51) which defines a questionnaire as “a set of questions on a form which is completed by the respondent in respect of a research project”. According to Hofstee (2006:132) a questionnaire can be used to elicit information directly from people who are presumed to have the information that is sought. However, use of a questionnaire can sometimes result in data that is biased or difficult to analyse (Hofstee, 2006: 132).

The data collection tool (research instrument) was an electronic self-administered questionnaire that was constructed by the researcher (Hofstee, 2006: 132). Hofstee (2006:133) says disadvantages of using a questionnaire are that it does not allow the researcher to interact with or observe participants; there are limitations in the depth to which the researcher can probe particular respondents; and the researcher has to stay within a set format. However, the advantages are that a questionnaire can offer more confidentiality to respondents; is easier to analyse for quantitative results; it can be sent to a larger number of



people; and, depending on how structured the questionnaire is, results can be easily compared at a later stage (Hofstee, 2006:133).

Questionnaires were emailed to participants that met the inclusion criteria. There were a number of reasons necessitating utilisation of mailed questionnaires. Snyman (1984:83), cited in De Vos et al. (2002:172) argued that information could be obtained from a large number of respondents, within a short time. Secondly, emails were also the best option to use to cover an extended geographical area as the SASOHN regions were spread throughout the provinces of SA. Thirdly, costs of mailed questionnaires were also considerably lower than with other methods of data collection (De Vos et al., 2002:172). Furthermore, as members were spread throughout the regions, they also utilise telephone and/or email to communicate. Not all members attended the scheduled regional meetings therefore face-to-face contact was also minimal. The researcher was based in the Western Cape therefore logistics, travel distance and expenses meant that she was unable to meet members individually leaving email as the best means of contact with the participants. The limitation of using mailed questionnaires is the risk of a high non-response rate (De Vos et al., 2002:172).

### **3.4.2 Questionnaire development**

The ADA position statement (ADA, 2009) was used as a basis from which to extract questions for the questionnaire. The researcher chose information that she felt was important to meet the objectives of the study regarding knowledge and practice of OHNPs in managing various aspects of diabetes. Questions were developed from this information. The researcher referred to literature on methods of developing questionnaires and viewed actual examples (StatPac, n.d.: <http://www.statpac.com>; University of Leeds, n.d.: <http://www.leeds.ac.uk>; Georgia Institute of Technology, n.d.: <http://www.cc.gatech.edu>). In addition, these questionnaires provided examples of types of questions to use (FAO, n.d.: <http://www.fao.org/>; Family Practice Management, n.d.: <http://www.aafp.org>; International Diabetes Federation, n.d.: <http://www.idf.org>).

On further review of the document, certain changes were made and questions rearranged to meet objectives, after consultation with supervisors and the statistician. Once final adjustments had been made to the layout and structure of the questionnaire, it was piloted.

### **3.4.3 Pilot study**

A pilot study was conducted to test and validate the proposed questionnaire as the questionnaire had been compiled by the researcher. The researcher distributed the pilot questionnaires at and outside of a SASOHN Conference. A covering letter explaining the

purpose of the study was distributed to each participant and each participant signed a consent form. Additional assistance was offered by one of the executive SASOHN members who undertook to collect those questionnaires that had not been handed back, on behalf of the researcher. When the researcher followed up on these questionnaires, the collected questionnaires had been mislaid and could not be accounted for.

Of the thirty questionnaires that were distributed, a total of sixteen questionnaires were returned. The researcher made adjustments to the questionnaire after the pilot questionnaires were analysed and the final questionnaire was developed. The types of questions included were closed and open-ended questions, Likert scales, and statements on which the respondents were required to react (De Vos et al., 2002:172). See Appendix C for a copy of the questionnaire.

Welman, Kruger and Mitchell (2005:175) describe a closed question as one that offers a respondent a range of options to choose from; and provided boxes for respondents to tick to indicate their choice of answer. An open-ended question has no range or prior list of answers for the respondent to choose from, and the respondent's response is noted *verbatim* (Welman et al., 2005:174). In a Likert scale, respondents have to indicate the degree to which they agree or disagree with a given statement (Welman et al., 2005: 157). The categories in questions 1.1 and 1.3 were sourced from the SASOHN Salary Survey (2007).

### **3.5 Validity and reliability of instrument**

The quality of the research data is dependent on the reliability and the validity of the questionnaire used in this research. The reliability of the questionnaire used is dependent on the validity and vice versa (Brink, 2006:165). The questionnaire was tested to prove the reliability, by piloting it. From the feedback, comments received from, and questions answered by the respondents, the questionnaire was considered reliable enough to address the objectives of the study. The questionnaire is valid because it answers the questions the researcher wanted to have answered.

### **3.6 Ethical considerations**

Ethical approval was obtained from CPUT Health and Wellness Sciences Faculty Research Committee and Ethics committee. A copy of the approval letter is attached as Appendix D.

The fundamental ethical principles of respect for persons, beneficence, and justice were upheld during the course of this study. In relation to the 'right to self-determination' the researcher treated the participants with autonomy by informing them of the proposed study and allowing them the choice to participate or not (Burns and Grove, 2009:190). Each

participant was given an informed consent to sign (Appendix F). Participants were free to withdraw from the study at any time as indicated in the cover letter (Appendix E).

All questionnaires received were allocated a unique reference number. To protect the participants' privacy, no names were used in the study, and the identity of the participants was not linked to individual responses (Burns and Grove, 2009: 195-196). All information received was treated as confidential and no data was collected from participants without their knowledge (Burns and Grove, 2009: 185). Electronic questionnaires and emails were stored on a password-protected computer to which only the researcher had access. In relation to the right to 'fair treatment', all participants were selected using the same inclusion criteria and had an equal opportunity to participate in the study (Burns and Grove, 2009: 196). As participants were very far away, it was difficult to refer them, and there was no emotional trauma attached to the study. While there was the potential for harm, all reasonable attempts have been made to counteract it (Hofstee: 119).

### **3.7 Data management**

#### **3.7.1 Process of data collection**

The email addresses of the members in each respective region were loaded into groups on Groupwise by the research assistant. A universal message was developed and emailed to the participants, with three documents, namely:

- Cover letter, providing information on the study (Appendix E),
- Informed consent (Appendix F), and
- Questionnaire (Appendix C).

All the respondents who had access to e-mails and were registered with SASOHN received the above-mentioned email and documents. The participants were requested to complete the questionnaire and email it back to the email address given on the cover letter and email message. A follow up email was sent a week later and at regular intervals thereafter, to request respondents that hadn't completed the questionnaire, to do so.

Of the original 3000 email addresses, only 1000 were delivered, which became the sample size. In an attempt to circumvent the emails that were undelivered, and to improve the low response rate, the researcher contacted the Chairpersons of the respective regions via SMS and emails to request that they forward the questionnaire to their members. The due date for return of completed questionnaires was extended because the response rate remained low. However, the data collection process was halted despite only having received 134 completed questionnaires due to time constraints.

### **3.7.2 Data capturing**

Of the 1000 emails sent, a total of 134 completed questionnaires were returned. Those emails received from respondents stating the reasons why they were unable to participate in the study, were stored as “declined responses”. The research assistant began the process of capturing the data onto the work computer of the researcher using the SPSS (Statistical Package for the Social Sciences), version 19 statistical programme. The computer was password protected and only the researcher and the research assistant had access to it. The data was captured from each questionnaire as it was received via email and each questionnaire was allocated a unique reference number to ensure confidentiality of the participants’. Each questionnaire was electronically saved in an allocated folder on the computer. The seven questionnaires that were received by hand/post were locked in a store-room in the office of the researcher for the period of the study. Numerical and string data were captured in the SPSS spreadsheet using the codes as on the questionnaire. Questionnaires 5, 8, 16, 24, 33, 35, 97 and 100 were deleted due to one respondent not being in SA and very few or nil questions being answered by the others.

Due to changes in the statistical packages used at the institution where the study was conducted, the data had to be re-captured in an Excel spreadsheet, causing delays in the analysis of the data. Data was checked by the researcher and errors corrected. If an answer to a question was “Other”, each answer was captured and then the data was divided into groups made of common/similar answers.

A change in supervisors and statisticians necessitated the data to be recaptured and transposed to enable analysis, which was done by the researcher herself. The capturing and re-capturing of the data was laborious and time-consuming as the researcher had no research assistant and did the capturing herself. This opened the way for human error and inconsistencies in data capturing as a different person was capturing the data and some answers were not interpreted in the same manner. However, the time spent also allowed the researcher to engage with the data in detail and allocate more appropriate codes especially for the incorrect/inconsistent responses for ease of analysis.

The final Excel data set was exported into and analysed using SPSS Version 21 software to generate frequency, percentage, mean and standard deviation and to “run” cross-tabulations. An initial analysis was done and errors noted and corrected, data was re-coded where applicable and descriptive statistics were used to analyse data. All final re-coding was done in SPSS by the statistician. All final data sets were saved electronically on a password-protected computer.

### **3.8 Process of analysis**

This subsection presents the process followed during analysis of the data. Analysis involves data being “broken down” into manageable themes and patterns to identify and describe trends and/or relationships between the variables under discussion (Mouton, 2001:108). The data sources were classified as belonging to the self-reporting category and the type of data collected was “primary data” (Mouton, 2001:99; Hofstee, 2006:51; Welman et al., 2005:149). As this was an exploratory study, the mode of reasoning was more inductive and a-theoretical (Mouton, 2001:152-153).

The objectives were condensed and rephrased to accommodate the knowledge and practices regarding screening, monitoring and management of diabetes as indicated in subsection 1.7. Therefore, only questions that specifically addressed the objectives were analysed. Appendix G provides information on which questions addressed the variables related to the objectives of the study. The questions were divided into knowledge and practice and listed under which objective they addressed. Some questions were not included in the analysis and responses that were inconsistent with the questions were rejected as explained in Chapter 4. The reasons were: ambiguous responses, respondents did not answer the questions asked, information was unhelpful in meeting objectives, and follow on questions were answered in error.

The first set of raw data that was analysed was the types of organisations/industries that the respondents worked in. For ease of analysis and understanding of contents, the names of the organisations/ industries were shortened and the organisations/industries were grouped into categories. Table 3.1 presents the organisations/industries, the categories they were grouped into and the total number of responses received per category.

In category 7, seven respondents indicated they worked in more than one type of organisation/industry, 2 respondents indicated they worked in other organisations/industries but did not stipulate which and 1 respondent provided inconsistent information (this respondent selected all of the organisations/industries). These responses were retained to ensure accuracy in correlation between responses and analyses in chapter four. For example, in subsection 4.3.1 respondents indicated the number of employees in their organisations/industries for each category. Respondents that would fall into category 7 provided information on the number of employees they had; therefore their responses had to be included in the analysis to ensure consistency of results.

**Table 3.8a: Categories of organisations and total number of responses**

Categories	Organisations	Total number of responses
Category 1	Chemical and Allied products	21 (16.7%)
Category 2	Retail trade Transport, Storage and Communication Other business for profit Finance and Education Wholesale trade	21 (16.7%)
Category 3	Mining	19 (15.1%)
Category 4	Food and Beverages	16 (12.7%)
Category 5	Other goods Electrical products Wood products	15 (11.9%)
Category 6	Building and Engineering Vehicle manufacturing	15 (11.9%)
Category 7	More than 1 type Other Incorrect	10 (7.9%)
Category 8	Community and Health services	9 (7.1%)
	Total	126

Questions were analysed in order of the variables and process of the management of diabetes as described in the conceptual model in chapter one. Knowledge and practice responses were separated in the analysis and presentation of results.

Simple descriptive statistics were used to compile close-ended questions. Most of the data analysis was done using Microsoft Excel's data analysis tool and SPSS (Mouton, 2001:153). Open-ended questions were captured in Microsoft Word and were compared for similarities and differences of responses.

### **3.9 Presentation of results**

The results of the analysis of data collected will be presented and described in chapter four. Closed-ended questions will be presented in tables and/or chart form. Open-ended questions will be used as a quotation to support information in tables.

### **3.10 Summary of chapter**

This chapter presented an overview of the research methodology for this study. The theoretical underpinnings used to ground the research activities associated with understanding how the management of diabetes were evaluated. Research design, research site, sample selection criteria, questionnaire distribution procedures, as well as data analysis tools were described. Data analysis methods were described and illuminated the importance and relevance of the research. All the statements from the structured questionnaire were coded for data analysis which will be carried out in the next chapter.

## CHAPTER FOUR: PRESENTATION OF RESULTS

### 4.1 Introduction

This chapter reported on key results of the study relevant to the objectives. As indicated in the methodology, one thousand questionnaires were sent out. However, only one hundred and twenty-six respondents responded. Tables and charts were used to present the results. In addition, comments from open-ended question responses were copied verbatim. In this chapter, the demographics of respondents; the number of employees and clients with diabetes; respondents' knowledge and practice of screening for diabetes; respondents' practice of diagnosis and follow up of clients with diabetes; monitoring and supervision of clients with diabetes and provision of continuity of care for clients with diabetes as well as respondents' management of diabetes in the workplace were discussed. The final subsection dealt with the constraints and limitations related to the capturing and analysis of the data.

### 4.2 Demographics of respondents

The demographics include the gender and age of respondents; types of occupational health qualifications of respondents; provinces that respondents practice in; the categories of organisations within which respondents work as well as respondents' hours and days of employment.

#### 4.2.1 Gender and age

Of the 126 respondents, 121 (96%) were females and only five (n=5; 4%) were males. Chart 4.2a presents the age range of respondents. Forty-nine (n=49, 38.9%) respondents' ages were between 51-60 years and 48 (38.1%) respondents were in the age group 41-50 years. Twenty-one (n=21, 16.7%) respondents were in the age group 31-40 years. Seven (n=7, 5.6%) respondents were above 60 years of age.

#### 4.2.2 Types of occupational health qualifications

Chart 4.2b shows the different types of occupational health qualifications that respondents had. The highest occupational health qualification obtained was a Master's degree (n=3; 2.4%) followed by Bachelor of Technology degree (n=30; 24%), Bachelor's degree (n=16; 12.8%), Diploma (n=37; 29.6%) and Certificate (n=29; 23.2%). Eight percent of respondents (n=10; 8%) indicated they had no additional qualification in occupational health.

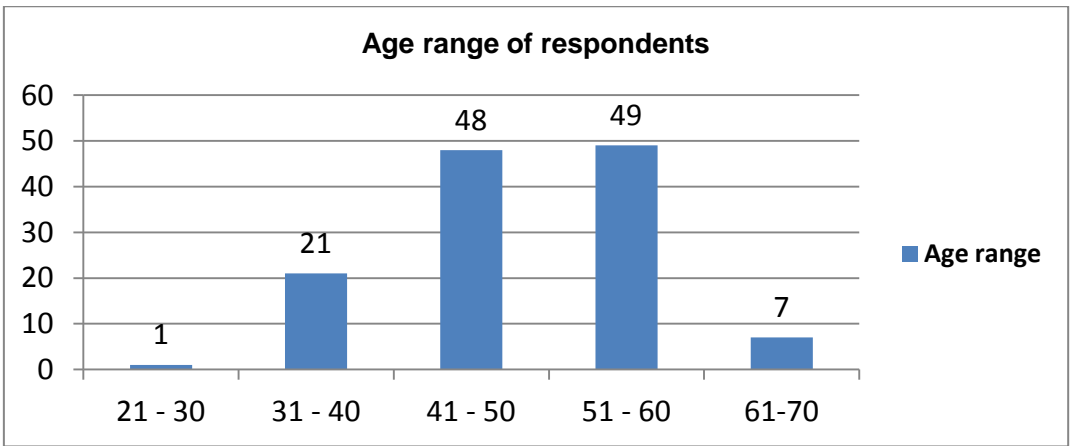


Chart 4.2a: Age range of respondents

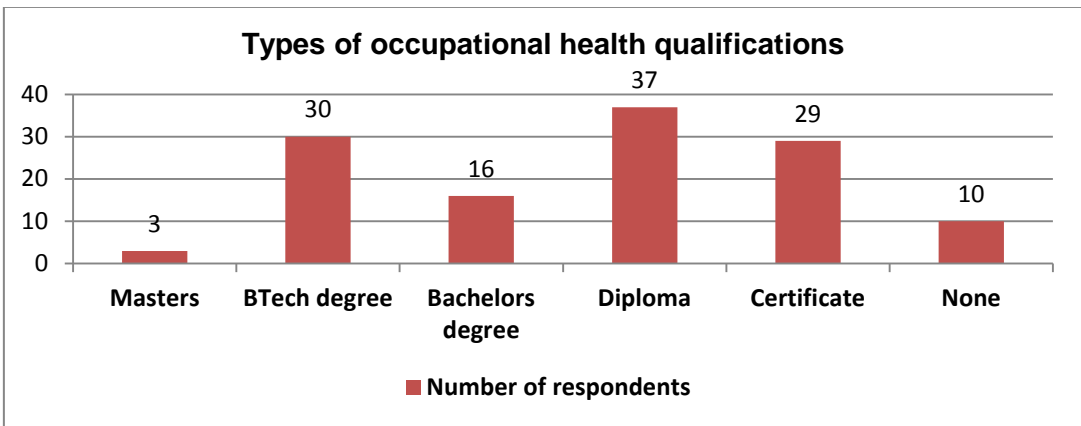


Chart 4.2b: Types of occupational health qualifications

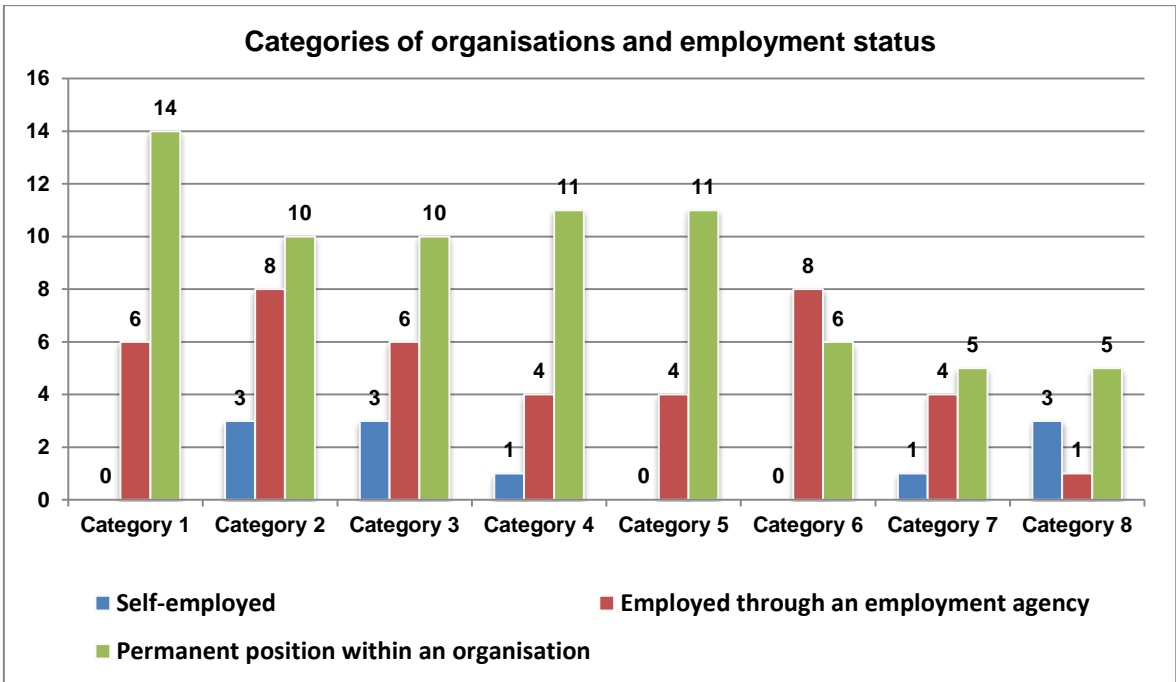


Chart 4.2c: Categories of organisations and employment status



### 4.2.3 Provinces of practice

Table 4.2a outlines the provinces where the respondents practice. The highest number of respondents were from the Western Cape (n=36; 28.6%) followed by Gauteng (n=31; 24.6%) and Kwa-Zulu Natal (n=21; 16.7%). Furthermore, five (3.9%) respondents indicated they worked in more than one province and eight (6.3%) did not provide information.

**Table 4.2a: Provinces of practice**

Province	Number of respondents	Percent (%)
Eastern Cape	10	7.9
Free State	2	1.6
Gauteng	31	24.6
KZN	21	16.7
Limpopo	4	3.2
Mpumalanga	6	4.8
Multiple	5	3.9
North West	2	1.6
Northern Cape	1	.8
Western Cape	36	28.6
Non-response	8	6.3
Total	126	

### 4.2.4 Categories of organisations with hours and days of employment

The types of organisations respondents worked in were divided into categories as described in the methodology (Chapter 3). Table 4.2b presents the categories that the types of organisations were divided into and the number of respondents within each category, from highest to lowest. One hundred and twenty-six (n=126) respondents provided information on type of organisation they are employed in, however some information was inconsistent. For example, some respondents selected more than one type of organisation or did not indicate type of organisation they were employed in and one respondent listed all provinces.

**Table 4.2b: Categories and types of organisations with number of respondents**

Categories	Types of organisations/industries	Respondents - N (%)
Category 1	Chemical and Allied products	21 (16.7%)
Category 2	Retail trade Transport, Storage and Communication Other business for profit Finance and Education Wholesale trade	21 (16.7%)
Category 3	Mining	19 (15.1%)
Category 4	Food and Beverages	16 (12.7%)
Category 5	Other goods Electrical products Wood products	15 (11.9%)
Category 6	Building and Engineering Vehicle manufacturing	15 (11.9%)
Category 7	More than 1 type Other Inconsistent	10 (7.9%)
Category 8	Community and Health services	9 (7.1%)
	Total	126

Table 4.2c presents the categories of organisations/industries, the number of respondents employed per category, the range of hours respondents work per day and the range of days respondents work per week. In both category 1 and 2 organisations, there were 21 respondents employed. Category 3 had 19 respondents; category 4 had 16 whereas categories 5 and 6 had 15 respondents employed there. Overall, 92 (79.3%) respondents worked between 5-8 hours per day with the highest number in categories 2 and 4 followed closely by categories 1, 6, 5 and 3. Overall, 99 (90%) respondents worked between 5-7 days per week with the highest number in categories 1 and 2.

**Table 4.2c: Categories of organisations with hours and days of employment**

Categories of organisations	Respondents employed per category	Hours of employment (range) per day			Days worked (range) per week	
		1 - 4	5 - 8	9 - 12	1 - 4	5 - 7
Category 1	21	1	14	2	1	18
Category 2	21	1	15	4	1	18
Category 3	19	1	11	4	5	11
Category 4	16	0	15	0	2	12
Category 5	15	1	12	2	2	12
Category 6	15	0	13	2	0	13
Category 7	10	1	6	2	0	7
Category 8	9	1	6	2	0	8
Total respondents	126	116			110	

#### 4.2.5 Employment status

Table 4.2d indicates respondents' employment status. Most respondents (n=72; 58.1%) were employed full time in an organisation. The least number of respondents (n=11; 8.9%) were self-employed.

**Table 4.2d: Employment status**

Employment status	N (%)
Self-employed	11 (8.8)
Employed through an employment agency	41 (33.1)
Full time employed in organisation	72 (58.1)
Total respondents	124

Chart 4.2c presents the categories of organisations and respondents' employment status. The highest number of respondents that were employed full time in the organisation was in category 1, followed by categories 4 and 5, then categories 2 and 3. The highest number of respondents employed through an employment agency was in categories 2 and 6.

### 4.3 Organisations, employees and clients with diabetes

This subsection describes categories of organisations, average age of employees, number of employees, number of clients with diabetes as well as the number of clients with diabetes seen by respondents per month.

#### 4.3.1 Categories of organisations, number of employees and age of employees

Table 4.3a provides information on the categories of organisations and number of employees. The majority of respondents (n=80; 67.8%) had between 1-500 employees working in organisations, with the highest number of respondents found in some areas of category 1. Following this, 23 (19.5%) respondents had between 501-1000 employees working in organisations with category 1 again having the highest number of respondents.

Categories 2 and 3 were the only organisations where respondents had more than 3000 employees working in the organisations.

**Table 4.3a: Respondents for number of employees and category of organisation**

Categories of organisations	Responses for number of employees (range)						
	1-500	501-1000	1001-1500	1501-2000	2001-2500	2501-3000	>3000
Category 1	15	6	0	0	0	0	0
Category 2	12	1	3	0	1	0	3
Category 3	12	3	0	1	1	1	1
Category 4	12	3	0	0	0	0	0
Category 5	10	2	1	0	1	0	0
Category 6	8	4	0	0	1	0	0
Category 7	4	3	0	1	0	0	0
Category 8	7	1	0	0	0	0	0
Total	80	23	4	2	4	1	4

Table 4.3b presents the responses in relation to what was the average age of the employees at respondent's' organisations/industry. One hundred and twelve (n=112; 88.9%) respondents provided information in relation to the average age of their employees. Most of the respondents (n=48; 42.9%) indicated that their employees' ages ranged from 36-40 years. Thirty-one (n=31; 27.7%) respondents reported their employees' average ages to be in the range of 31-35 years while 10 (9%) respondents' employees had an average age of over 46 years. Fourteen (n=14; 11/1%) respondents did not respond to this question.

**Table 4.3b: Responses for average age of employees**

Average age of employees (range)	Responses	Percent
< or equal to 25	1	0.8%
26-30	10	7.9%
31-35	31	24.6%
36-40	48	38.1%
41-45	12	9.5%
46-50	6	4.8%
More than 50	4	3.2%
Non-response	14	11.1%
	126	

### 4.3.2 Number of clients with diabetes and number of clients seen per category per month

Table 4.3c presents the number of employees diagnosed with diabetes within each category of organisation. More than 66 (50%) respondents indicated having between 1-20 employees diagnosed with diabetes, 42 (35.6%) respondents had 10 or less employees and 24 respondents (20.3%) had between 11-20 employees diagnosed with diabetes. The highest number of respondents managing employees diagnosed with diabetes was found in categories 1 and 5 followed by category 4. Fourteen (n=14; 11.9%) respondents reported having more than 50 employees diagnosed with diabetes, in categories 1, 2, 3, 6, 7 and 8.

**Table 4.3c: Respondents for number of employees diagnosed with diabetes and category of organisation**

Categories of organisations	Respondents for number of employees (range) diagnosed with diabetes						Total
	<10	11-20	21- 30	31-40	41-50	>50	
Category 1	9	5	3	1	1	1	20
Category 2	6	1	1	2	3	6	19
Category 3	6	5	2	2	0	3	18
Category 4	4	8	3	0	1	0	16
Category 5	9	1	3	0	1	0	14
Category 6	4	1	3	4	2	1	15
Category 7	2	2	1	0	1	2	8
Category 8	2	1	2	0	2	1	8
Total	42	24	18	9	11	14	118

Respondents were required to indicate the number of male versus female employees diagnosed with diabetes. However, information provided was inconsistent as it did not correlate with the total numbers of employees diagnosed with diabetes and subsequently were not included in the analysis.

In relation to the number of clients with diabetes seen per day and per week the question was not adequately answered and will be discussed further in the discussion chapter.

Table 4.3d indicates the number of clients with diabetes seen per month in each category of organisation. Forty-six (n=46; 46.5%) respondents indicated that 10 or less clients with diabetes were seen per month followed by 23 (23.2%) respondents who attended to between 11-20 clients with diabetes per month. Eleven (n=11; 11.1%) respondents indicated they attended to more than 50 clients with diabetes per month. The highest number of respondents that attended to diabetic clients was in categories 1 and 4. The next highest number of respondents (n=15) was in category 3 followed by categories 2 and 5 with 14 respondents each.

**Table 4.3d: Categories of organisations and respondents' number of clients with diabetes seen per month**

Categories of organisations	Respondents' number of clients with diabetes (range) seen per month						Total
	<10	11-20	21-30	31-40	41-50	>50	
Category 1	8	4	1	1	1	1	16
Category 2	5	2	0	2	0	5	14
Category 3	6	2	1	2	0	4	15
Category 4	8	4	0	4	0	0	16
Category 5	11	0	3	0	0	0	14
Category 6	3	6	0	2	0	0	11
Category 7	2	3	0	0	0	1	6
Category 8	3	2	0	1	1	0	7
Total	46	23	5	12	2	11	99

#### **4.4 Respondents' knowledge of diabetes and screening for diabetes in the workplace**

Subsection 4.4 present respondents' perception of their knowledge of diabetes including rating of their knowledge on aspects of diabetes, predisposing factors for developing diabetes and knowledge of IFG and IGT. Furthermore, respondents' knowledge of screening for diabetes will be presented including what fasting referred to; what diagnostic tests were used to screen for IFG and IGT; what tests were used to diagnose diabetes as well as the range of measurements used to diagnose diabetes using the FBG and OGTT tests.

##### **4.4.1 Respondents' knowledge of diabetes**

Table 4.4a presents results of respondents' rating of their own knowledge on different aspects of diabetes. Fifty-six (n=56; 44.8%) respondents rated their knowledge of diabetes management as average and 55 (44%) rated their knowledge of diabetes management as good. Nine (n=9; 7.2%) respondents rated their knowledge of diabetes management as very good. With regards to blood glucose control, 63 (50.4%) respondents rated their knowledge as good and 38 respondents (30.4%) rated their knowledge as average. Sixty-nine (n=69; 55.2%) respondents rated their knowledge of screening as good while 29 (23.2%) respondents rated their knowledge as average. Twenty-five (n=25; 20%) respondents rated their knowledge of screening as very good. In relation to monitoring, 70 (56%) respondents rated their knowledge as good while 29 (23.2%) respondents rated their knowledge as average. More than half of the respondents (n=67; 53.6%) rated their knowledge on glucose testing and complications of diabetes (n=69; 55.2%) as good.

**Table 4.4a: Respondents' rating of knowledge on aspects of diabetes**

Aspects of diabetes	Respondents' rating of knowledge				
	Very Poor N (%)	Poor N (%)	Average N (%)	Good N (%)	Very Good N (%)
Diabetes management	1 (0.8%)	4 (3.2%)	56 (44.8%)	55 (44%)	9 (7.2%)
Blood glucose control	1 (0.8%)	5 (4%)	38 (30.4%)	63 (50.4%)	18 (14.4%)
Screening	1 (0.8%)	1 (0.8%)	29 (23.2%)	69 (55.2%)	25 (20%)
Monitoring	1 (0.8%)	4 (3.2%)	29 (23.2%)	70 (56%)	21 (16.8%)
Glucose testing	1 (0.8%)	4 (3.2%)	22 (17.6%)	67 (53.6%)	31 (24.8%)
Complications of diabetes	3 (2.4%)	1 (0.8%)	31 (24.8%)	69 (55.2%)	21 (16.8%)

Other information requested related to prevalence of diabetes in SA, nutrition, weight management, physical activity, use of medication, and foot and eye care. In relation to the prevalence of diabetes in SA, 48 (39%) respondents rated their knowledge as average while 37 (30.1%) respondents rated their knowledge to be good. Respondents rated their knowledge of nutrition (n=63; 50.4%), weight management (n=53; 42.4%), physical activity (n=63; 50.4%), use of medication (n=58; 46.4%) and foot and eye care (n=62; 50.4%) as good.

In response to the question on types of diabetes, 115 respondents provided information. Seventy (n=70; 60.9%) respondents indicated there were two types, 39 (34%) respondents indicated there were either one or three types while only 6 (5.2%) respondents gave the correct answer of four types of diabetes.

Table 4.4b indicates responses to predisposing factors for developing diabetes. The highest number of responses (n=118; 93.7%) was received for the predisposing factor of a parent with diabetes. In relation to Body Mass Index, 103 (81.7%) respondents indicated the criteria of more than or equal to 25 kg/m<sup>2</sup> with additional factors was a predisposing factor for developing diabetes. Respondents indicated physical inactivity (n=100; 79.4%), ethnicity with high risk of diabetes (n=94; 74.6%) and women employees with gestational diabetes (n=92; 73%) were predisposing factors for developing diabetes. The lowest response (n=68; 54%) received was for employees with history of cardiovascular disease being a predisposing factor for developing diabetes.

**Table 4.4b: Responses to predisposing factors for developing diabetes**

Predisposing factors	Responses			
	Yes N (%)	No N (%)	Don't know N (%)	Non-response N (%)
Parent with diabetes	118 (93.7%)	2 (1.6%)	1 (0.8%)	5 (4%)
BMI $\geq$ 25 kg/m <sup>2</sup> with additional factors	103 (81.7%)	6 (4.8%)	11 (8.7%)	6 (4.8%)
Physical inactivity	100 (79.4%)	11 (8.7%)	2 (1.6%)	13 (10.3%)
Ethnicity with high risk of diabetes	94 (74.6%)	12 (9.5%)	8 (6.3%)	12 (9.5%)
Women employees with gestational diabetes	92 (73%)	13 (10.3%)	8 (6.3%)	13 (10.3%)
Employees with history of cardiovascular disease	68 (54%)	24 (19%)	13 (10.3%)	21 (16.7%)

Respondents provided further information on whether IFG and IGT were conditions termed “pre-diabetes” and were considered risk factors for developing diabetes. Eighty-seven (n=87; 70%) respondents agreed that IFG and IGT were conditions regarded as “pre-diabetes” while 19 (15.3%) respondents indicated that they did not know. In relation to whether IFG and IGT were risk factors for developing diabetes, 104 (84.6%) respondents agreed while 14 (11.4%) respondents indicated they did not know. (See Chart 4.4a)

#### 4.4.2 Respondents’ knowledge of screening for diabetes in the workplace

Information was provided by respondents on their knowledge of what fasting referred to. One hundred and nine (n=109; 90.2%) respondents gave the correct answer that fasting referred to no caloric intake for at least 8 hours.

Chart 4.4b presents information on respondents’ knowledge of diagnostic test used to screen for IFG and IGT. One hundred and twenty-one (n=121) respondents provided information on the test used to screen for IFG. The majority of respondents (n=78; 64.5%) indicated that Fasting Blood Glucose was the test used. Three (n=3; 2.5%) respondents indicated that another test was used to screen for IFG however only one indicated the other test used was the HbA1C test. One hundred and fourteen (n=114) respondents provided information on which test was used to screen for IGT. Eighty-one (n=81; 71.1%) respondents selected the Oral Glucose Tolerance Test as the test used to screen for IGT. Of the 12 (10.5%) respondents that indicated other tests were used to screen for IGT, eight respondents said these tests included the HbA1C and glucostix.



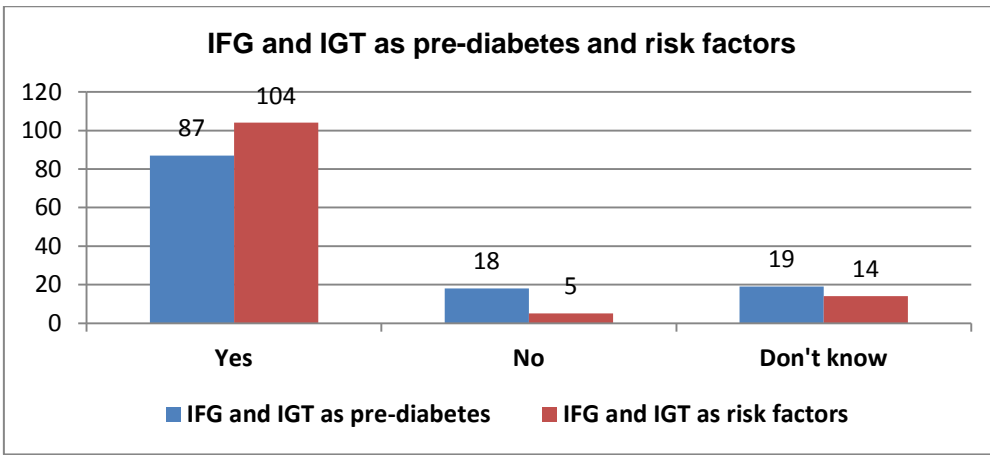


Chart 4.4a: Responses for IFG and IGT as pre-diabetes and as risk factors

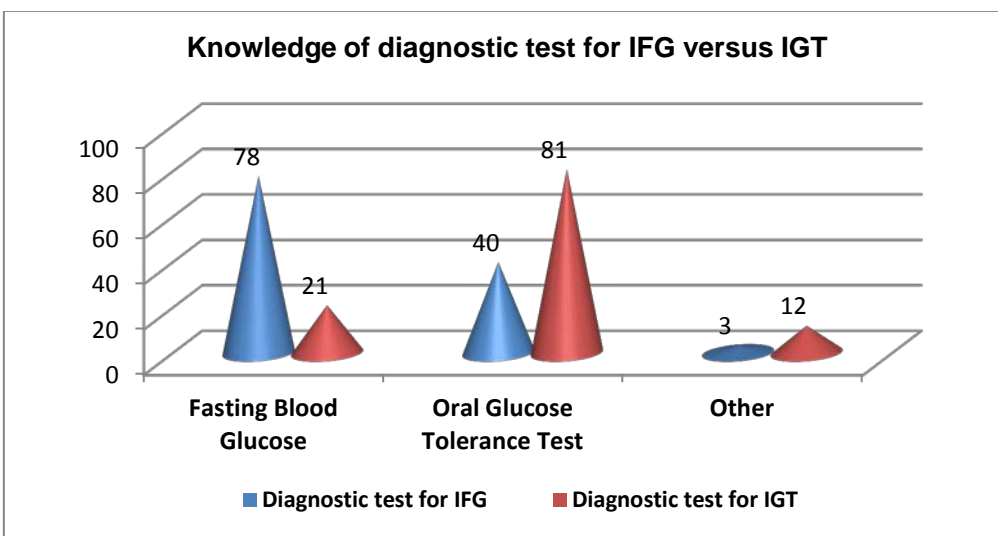


Chart 4.4b: Respondents' knowledge of diagnostic test for IFG versus IGT

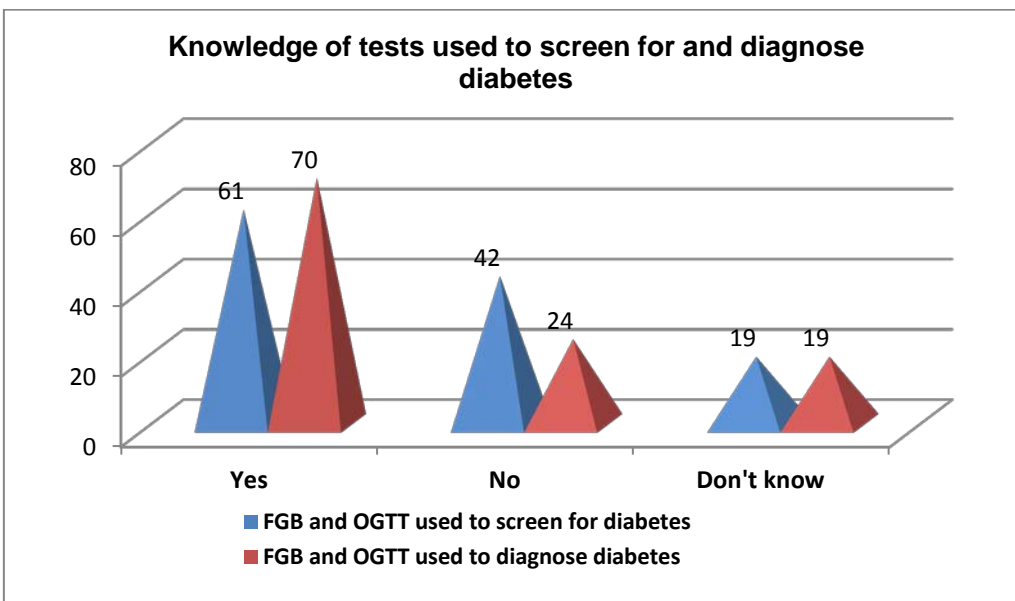


Chart 4.4c: Respondents' knowledge of tests used to screen for and diagnose diabetes

Chart 4.4c outlines respondents' knowledge of whether both the FGB and OGTT were used to screen for diabetes versus diagnose diabetes. One hundred and twenty-two (n=122) respondents provided information on whether both the FGB and OGTT were used to screen for diabetes. Sixty-one (n=61; 50%) respondents indicated that both tests were used to screen for diabetes while 19 (15.6%) respondents did not know. One hundred and thirteen (n=113) respondents provided information on whether both the FGB and OGTT are used to diagnose diabetes. Seventy (n=70; 62%) respondents indicated that both tests were used to diagnose diabetes while 19 (16.8%) respondents did not know.

Respondents provided information on their knowledge of the range of measurements within which a client is deemed to be diabetic using the FGB and OGTT diagnostic tests. Ninety-four (n=94; 79%) respondents indicated the FBG test result should be greater than or equal to 126mg/dl ( $\geq 7\text{mmol/l}$ ) for a client to be deemed to have diabetes. The range used for diagnosing that a client has diabetes using the OGTT diagnostic test was measured 2 hours after a bolus of glucose was given. Forty-eight (n=48; 47%) respondents indicated the OGTT measurement to be a plasma glucose level of 140-199 mg/dl (7.8-11.0 mmol/l). A further 38 (37.3%) respondents indicated the OGTT measurement should be a plasma glucose level greater than or equal to 200 mg/dl (greater than or equal to 11.1 mmol/l). (See Chart 4.4d)

#### **4.5 Respondents' practice of screening for diabetes in the workplace**

This subsection deals with respondents' practice of screening. The components of screening include the prevention of diabetes by raising awareness of diabetes, and screening employees in the workplace to detect and diagnose diabetes early so that the disease can be managed. Information will be presented on which clients were screened, at what age these clients were screened, what the average age range of employees was, what clients were screened for and which diagnostic tests were used to screen clients for diabetes in their practice.

In relation to the components of screening, 122 respondents (97.6%) indicated that they do raise awareness of diabetes in their workplaces. Chart 4.5a presents approaches used by respondents to create awareness of diabetes. One hundred and thirteen respondents (n=113; 92.6%) use one-on-one consultations, 81 (66.4%) use health promotion/education drives/campaigns and 81 (66.4%) use wellness interventions. A further 19 respondents indicated they used other approaches to raise awareness of diabetes including posters, pamphlets, emails, small group discussions and referrals. However, two responses were inconsistent for example citing "all/annual medicals". The non-response rate for health promotion/education drives/campaigns was 31 (25.4%) and for wellness interventions the non-response rate was 32 (26.2%).

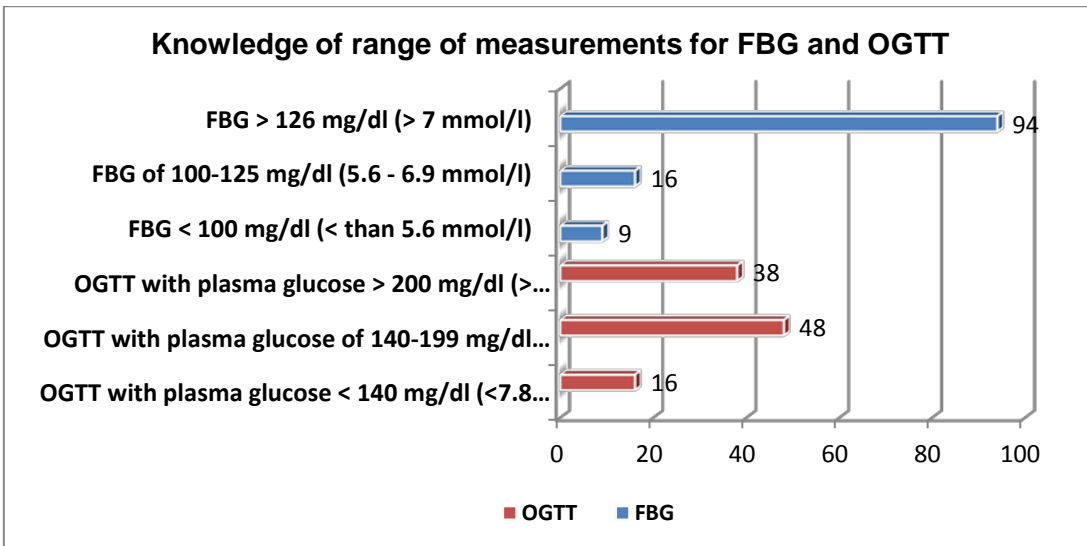


Chart 4.4d: Respondents' knowledge of range of measurements for FBG and OGTT tests

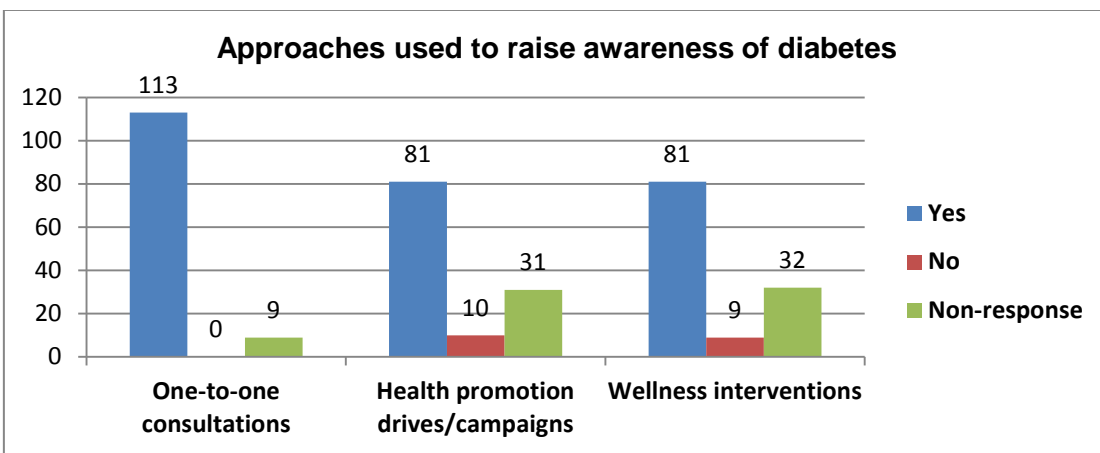


Chart 4.5a: Approaches used to raise awareness of diabetes

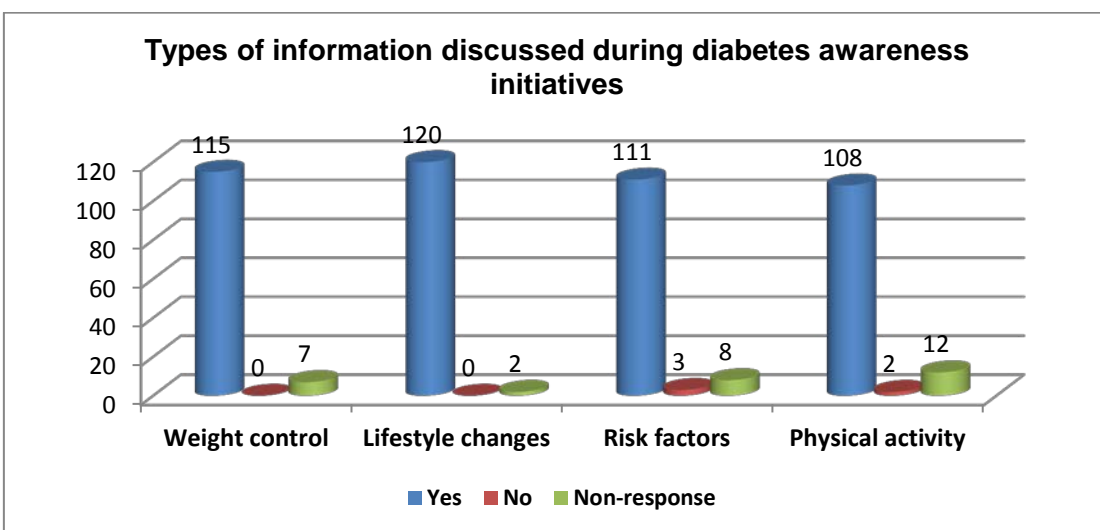
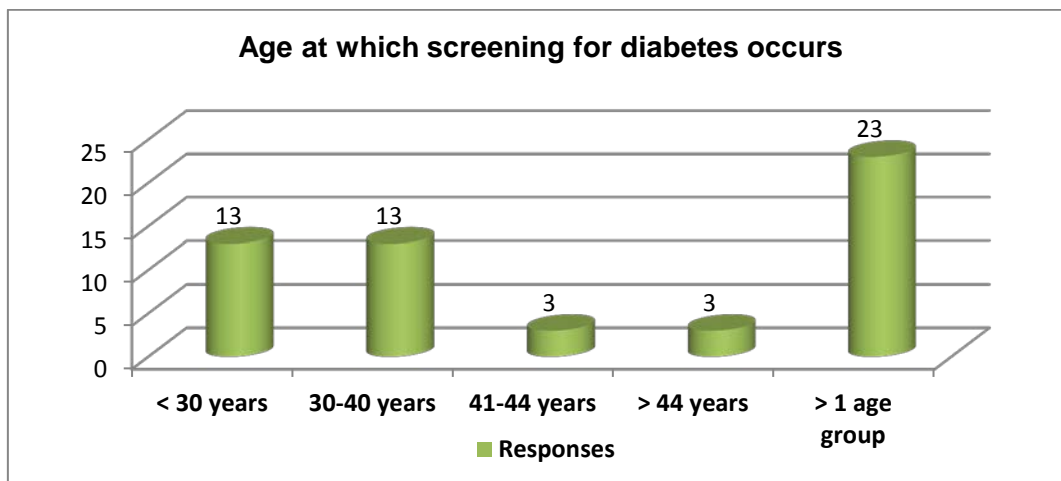


Chart 4.5b: Types of information discussed during diabetes awareness initiatives

Chart 4.5b outlines types of information provided during diabetes awareness initiatives. One hundred and fifteen (n=115; 94.3%) respondents provided information on weight control, 120 (98.4%) respondents provided information on lifestyle changes, 111 (91%) respondents provided information on risk factors and 108 (88.5%) respondents provided information on physical activity. A further 35 respondents indicated different types of information discussed during diabetes awareness initiatives. For example medication, complications, nutrition, foot care, family support, glucometer readings, risks, family planning, recreation, shift work, reduction of alcohol and signs and symptoms of diabetes.

Sixty-four (n=64; 50.8%) respondents routinely screened all their clients for diabetes. Chart 4.5c presents the age ranges at which respondents perform the screening. Thirteen (n=13; 20.3%) respondents performed screening for diabetes at the age group of younger than 30 years. An equal number of respondents (n=13; 20.3%) indicated they screened clients at 30-40 years of age. Although required to select only one of the age groups, 23 (35.9%) respondents selected more than one age group while nine (14.1%) respondents did not indicate at which age they screened for diabetes. A further 14 respondents provided information however this information was inconsistent as they previously indicated they do not routinely screen all clients for diabetes. Therefore, information from this group of respondents was not included in the analysis. In addition, 54 (84.3%) respondents indicated that they would re-screen their clients annually if results of the initial screening were normal.



**Chart 4.5c: Age at which screening for diabetes occurs**

Sixty-two (n=62; 49.2%) respondents indicated that they did not routinely screen all their clients for diabetes. Only clients presenting with risk factors such as obesity, BMI above 25 kg/m<sup>2</sup> hypertension, family history of diabetes and clients over 40 years of age were screened. Furthermore, those clients presenting with signs and symptoms such as: *polyuria*,

*polydipsia, recurrent infections, glucosuria, dry mouth, nocturnal micturition and malaise*” were also screened. Another category of employees that were screened were described as: *“those employed as drivers, working in cold storage areas and bakeries, construction workers and those working in dangerous areas”*. Screening was also performed annually on permanent employees as well as during pre-employment or periodical examinations. One respondent indicated that screening was included when testing for wellness and another respondent indicated that screening was conducted according to company policy. A further four respondents provided information however this information was inconsistent as they previously indicated they do routinely screen all clients for diabetes. Therefore, responses from the four respondents were excluded from the analysis.

One hundred and thirteen respondents (n=113) provided information on whether clients with IFG or IGT were screened for diabetes. Forty-five (n=45; 39.8%) respondents indicated they did screen their clients with IFG and IGT for diabetes while 35 (31%) respondents did not screen their clients with IFG and IGT for diabetes. A further 33 (29.2%) respondents indicated they did not know if clients with IFG and IGT were screened for diabetes. Amongst the 45 respondents that did screen their clients with IFG and IGT for diabetes, 34 respondents did so annually. Ten (n=10) respondents screened their clients with IFG and IGT for diabetes at other periods citing *“monthly, 3 – 6 monthly, when need arises or when clients present to the clinic for minor ailments”*.

Eighty-four (n=84; 70.6%) respondents indicated that the FBG test was used to screen for diabetes and 7 (5.9%) respondents used the OGTT. Twenty-eight (n=28; 23.5%) respondents indicated they used other techniques to screen for diabetes, of which 19 respondents described what other tests were used, i.e., *“HbA1C test, HGT, urine test, random blood glucose, a combination of tests and referral”*. (See Table 4.6a)

## **4.6 Respondents’ practice of diagnosis and follow up of clients with diabetes in the workplace**

This subsection deals with the diagnostic test undertaken to diagnose diabetes as well as immediate care and follow up tests that are performed after diagnosis of diabetes in clients.

### **4.6.1 Test undertaken by respondents to diagnose diabetes**

Table 4.6a presents the responses for the tests undertaken to screen for versus diagnose diabetes as received from 100 respondents. Sixty-six respondents (n=66; 66%) used the FBG test to diagnose diabetes while 14 (14%) respondents used the OGTT. Twenty (n=20; 20%) respondents indicated they used other tests to diagnose diabetes, e.g. *“HbA1C,*

*random blood glucose test, urine dipstix or a combination of tests*". A further 19 respondents provided inconsistent information, e.g. *"more than 1 answer was selected, do not diagnose, refer to clinics and GP or we only screen and refer"*. Information provided by the 19 respondents was not included in the analysis.

**Table 4.6a: Responses for tests used to screen for versus diagnose diabetes**

Type of diagnostic test used	Number of responses (N)	
	To screen for diabetes	To diagnose diabetes
FBG	84	66
OGTT	7	14
Other	28	20
Total	119	100

#### 4.6.2 Immediate care performed on diagnosis of diabetes

Table 4.6b presents types of immediate care performed on diagnosis of diabetes. The majority, i.e. between 80.2-89.4%, of respondents indicated that each of the five aspects of immediate care was performed. Few respondents, i.e. between 1.9-4%, indicated they did not know if the five aspects of care were performed. A further 30 respondents indicated they performed other care on diagnosis of diabetes including *"eye care, counselling, urea and electrolytes screening, and clients are referred to the general practitioner, physician, podiatrist, dietician and optician"*.

**Table 4.6b: Types of immediate care performed on diagnosis of diabetes**

Initial care given	Yes N (%)	No N (%)	Don't know N (%)
Complete medical evaluation	85 (81%)	18 (17.1%)	2 (1.9%)
Examination to detect complications	81 (81.8%)	14 (14.1%)	4 (4%)
Review of treatment/glycaemic control	73 (80.2%)	16 (17.6%)	2 (2.2%)
Formulation of a management plan	81 (80.2%)	16 (12.7%)	4 (4%)
Provision of a basis for continuing care	84 (89.4%)	8 (8.5%)	2 (2.1%)

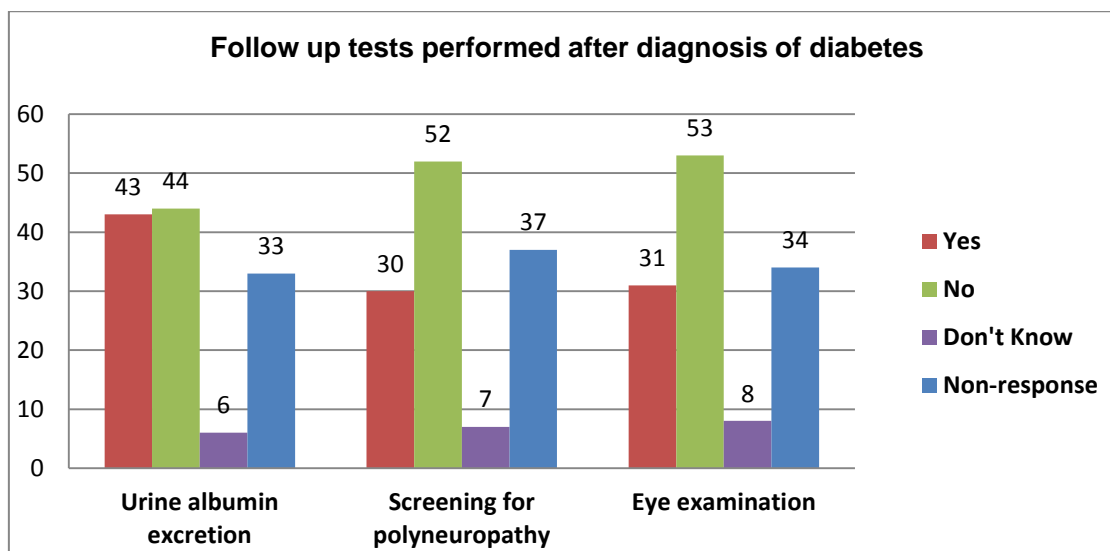
#### 4.6.3 Follow up tests performed after diagnosis of diabetes

Table 4.6c and Chart 4.6a outline responses for follow up tests performed after clients had been diagnosed with diabetes. Forty-three (n=43; 34.1%) respondents conducted a urine albumin excretion test, 30 (23.8%) respondents conducted screening for distal symmetric polyneuropathy while 31 respondents (24.6%) conducted a dilated and comprehensive eye examination after clients were diagnosed with diabetes. The non-response rate for the follow up tests performed were 33 (26.2%) respondents for the urine albumin test, 37 (29.4%) respondents for the distal symmetric polyneuropathy screening and 34 (27%) respondents for the dilated and comprehensive eye test. A further 14 (11.1%) respondents indicated that

other tests were conducted on diagnosis of diabetes and provided information on what these tests were. The other tests conducted included: “blood pressure check, glucostix, weight, BMI, cholesterol, HbA1C, lipogram, ECG, urine test and eye test” or clients are referred to a doctor, diabetic clinic or optometrist.

**Table 4.6c: Follow up tests performed after diagnosis of diabetes**

Follow up tests performed	Yes N (%)	No N (%)	Don't Know N (%)	Non- response N (%)
Urine albumin excretion	43 (34.1%)	44 (34.9%)	6 (4.8%)	33 (26.2%)
Screening for distal symmetric polyneuropathy	30 (23.8%)	52 (41.3%)	7 (5.5%)	37 (29.4%)
Dilated and comprehensive eye examination	31 (24.6%)	53 (42.1%)	8 (6.3%)	34 (27%)



**Chart 4.6a: Follow up tests performed after diagnosis of diabetes**

Additional information was provided by 14 (11.1%) respondents who indicated that there were no other tests conducted by them after clients had been diagnosed with diabetes and provided further information, some of which was inconsistent. The responses included: “all other tests are done by the GP, Municipal clinic or private doctor; examinations done, tests ordered and treatment initiated by OMP; only HGT and urinalysis done or tests are not done at our internal clinic”. Other responses included “clients are referred for proper screening and management, referral to diabetic centre as have reduced resources and employees are serviced by a wellness programme”. Information provided by the 14 respondents was not included in the analysis.

## **4.7 Monitoring and supervision of clients with diabetes in the workplace**

Respondents provided information on their actual practice in monitoring of glucose, monitoring of risk factors and follow-up of the mental health status of clients with diabetes. Monitoring refers to follow up and supervision of clients on a day-to-day basis to keep them healthy in order to continue working.

### **4.7.1 Monitoring and supervision of glycaemic control in clients with diabetes**

This subsection deals with the signs and symptoms used to identify hypoglycaemia, what treatment is given to clients with hypoglycaemia and the monitoring of the effectiveness of glycaemic control in clients with diabetes.

Table 4.7a presents responses for the open-ended question where respondents were asked to identify the signs and symptoms they used to identify hypoglycaemia. Similar responses were grouped together and divided into autonomic symptoms, neurological symptoms, neurological signs as well as other signs and symptoms. The responses were listed under these headings and are presented from the highest number of responses to the lowest, not in order of priority. In relation to the autonomic symptoms, the highest number of responses (n=73) were for sweating/clamminess followed by dizziness/faintness (n=62) and tremors/shaking (n=45). Twenty-seven (n=27) respondents wrote hunger, 19 respondents each wrote palpitations and increased blood pressure/pulse and tachycardia. The least responses were written for anxiety (n=18) and fatigue (n=16).

The responses received for neurological symptoms were confusion/delirium (n=42) followed by double-vision (n=24), behavioural change (n=23) and headache (n=21). Less responses were received for speech disorders (n=13), drowsiness (n=9) and inability to concentrate (n=6). Twelve (n=12) respondents wrote that unconscious/coma were signs of hypoglycaemia. Seven (n=7) respondents wrote convulsions and four wrote depressed consciousness were also signs of hypoglycaemia. These responses were named neurological signs. Additional information provided was divided into other signs and symptoms. These responses were low blood glucose (n=26), oral effects (n=20), pallor (n=16) and weakness (n=15). The lowest responses were received for gastro-intestinal effects (n=9), other effects (n=9) and motor effects (n=5). Eight (n=8) responses provided inconsistent information while 17 respondents did not provide any information on the signs and symptoms used to identify hypoglycaemia.



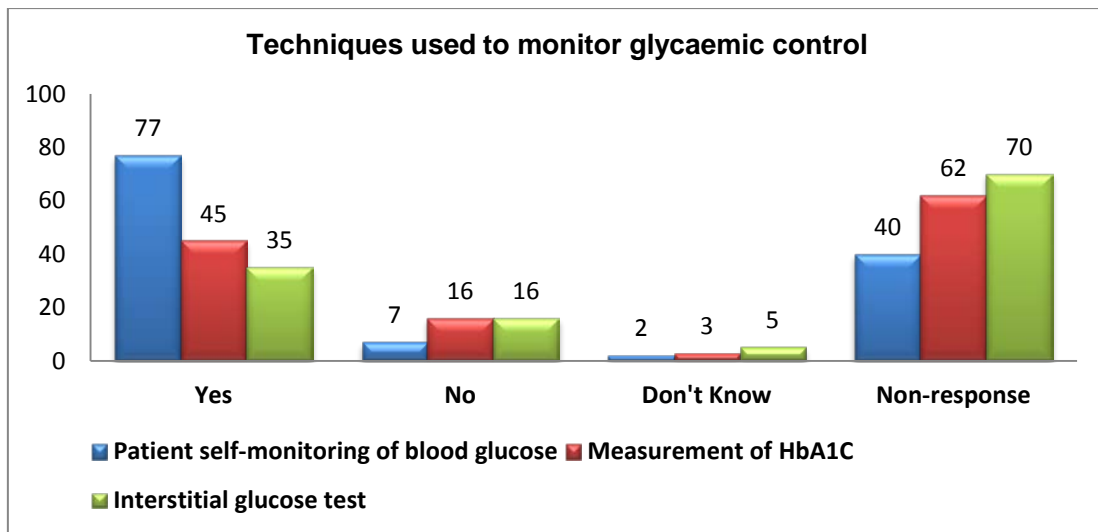
**Table 4.7a: Responses for the signs and symptoms of hypoglycaemia**

<b>Autonomic Symptoms</b>	<b>Responses</b>	<b>Neurological Symptoms</b>	<b>Responses</b>
Sweating/clamminess	73	Confusion/delirium	42
Dizziness/faintness	62	Double vision	24
Tremors/shaking	45	Behavioural change	23
Hunger	27	Headache	21
Palpitations	19	Speech disorder	13
Increased BP, pulse/Tachycardia	19	Drowsiness	9
Anxiety	18	Inability to concentrate	6
Fatigue	16		
<b>Neurological Signs</b>	<b>Responses</b>	<b>Other signs &amp; symptoms</b>	<b>Responses</b>
Unconscious/coma	12	Low blood glucose	26
Convulsions	7	Oral effects	20
Depressed consciousness	4	Pallor	16
		Weakness	15
		Gastro-intestinal effects	9
		Other effects	9
		Inconsistent responses	8
		Motor effects	5
Non-response	17		

In relation to treatment given to conscious clients with hypoglycaemia, 113 (89.7%) respondents provided information. Forty-five (n=45; 39.8%) respondents indicated they administer 10-15g of glucose, 26 (23%) respondents indicated 15-20g of glucose followed by 19 (16.8%) respondents who indicated they give 20-25g of glucose to conscious clients. However, none of the respondents indicated how the glucose was administered. Nineteen (n=19; 16.8%) respondents indicated other treatment was given including: *“rehydrate, glucogel, glucose sweets, fruit juice, milk, syrup, honey, jam, coke, energade, saline drip with 50% glucose and a combination of these treatments”* or clients are *“referred to the local clinic or taken by ambulance to hospital”*. Four (n=4; 3.5%) respondents provided inconsistent information, e.g. *“medicines are not administered, not sure, clients know so don’t usually come and clients are referred”*. The four inconsistent responses were not included in the analysis.

Chart 4.7a presents techniques used to monitor effectiveness of glycaemic control. Seventy-seven (n=77; 61.1%) respondents used the blood glucose as monitored by clients, 45 (35.7%) respondents used HbA1C measurement and 35 (27.8%) respondents used an interstitial glucose test to monitor glycaemic control. Twenty-one (n=21) respondents provided additional information on techniques used to monitor glycaemic control, for example *“clinic visits for HGT, measurement of HbA1C if medical aid pays, urinalysis and random blood glucose, blood glucose monitoring in the clinic, feedback from Municipal clinic”*. However, some information was inconsistent for example: *“during medicals, monthly check in clinic and we do not treat because we don’t do PHC”*. The number of respondents that did

not provide information for measurement of HbA1C (n=62; 49.2%) and interstitial glucose test (n=70; 55.6%) were higher than the number of respondents that did provide information.



**Chart 4.7a: Techniques used to monitor glycaemic control**

Respondents (n=120; 95.2%) provided information on what the goal percentage was for the HbA1C test in clients with diabetes. The highest number of responses was from 43 (35.8%) respondents that selected the option of “Don’t know”, followed by 36 (30%) respondents that indicated the correct answer of an HbA1C result less than 7%. Twenty-three (n=23; 15%) respondents indicated the goal percentage for HbA1C to be between 7-10% and 18 respondents (15%) indicated less than 5%.

Additional information was provided from 115 respondents on what percentage of their clients with diabetes maintains good glycaemic control. Fifty-three (n=53; 46.1%) respondents indicated they did not know what percentage of their clients maintain good glycaemic control. Sixty-two (n=62; 53.9%) respondents indicated the percentage of their clients that maintain good glycaemic control to be between 41-60% (n=19), between 61-80% (n=19), less than or equal to 20% (n=12) and between 81-100% (n=9). The responses of the remaining 62 OHNPs (52.1%) regarding what percentage of their diabetic clients maintain good glycaemic control were inconsistent and were disregarded/recorded as incorrect. The 62 responses were not included in the analysis.

In relation to how often in a given year the HbA1C was tested in clients with diabetes with stable glycaemic control, 57 (49.1%) respondents indicated they never tested the HbA1C in diabetics with stable glycaemic control while 33 (28.4%) respondents tested the HbA1C once a year. Eleven (n=11; 9.5%) respondents tested the HbA1C twice a year and 5 (4.3%) respondents tested 3-4 times a year. Ten (n=10; 8.6%) respondents provided the following

information: “annual if medical aid pays, as requested by client, clients go to private doctor, never, and I just advise them to get it done and what the level should be, not done at clinic level but at the GP/Municipal clinic, on Doctor’s orders, random or refer to GP”. (See Chart 4.7b)

Further information was provided on how often HbA1C test was performed in clients that were not maintaining glycaemic control. Fifty-one (n=51; 44.3%) respondents indicated they never tested the HbA1C. Fourteen (n=14; 12.2%) respondents indicated once a year, 13 (11.3%) respondents indicated twice a year, and 17 (14.8%) respondents indicated 3-4 times a year. Twenty (n=20; 17.4%) respondents provided additional information however some responses were inconsistent, for example, “12 times; depends on the client, doctor, glucose levels or medical aid; as requested by client or doctor; every 3 months if unstable and in high-risk job e.g. driving”. Other inconsistent information included: “monthly or random, not done at clinic level but at GP/Municipal clinic; repeat test till normal level is obtained or refer them to Day hospital/GP”. Chart 4.7b depicts the responses for how often the HbA1C is tested in clients with stable versus unstable glycaemic control.

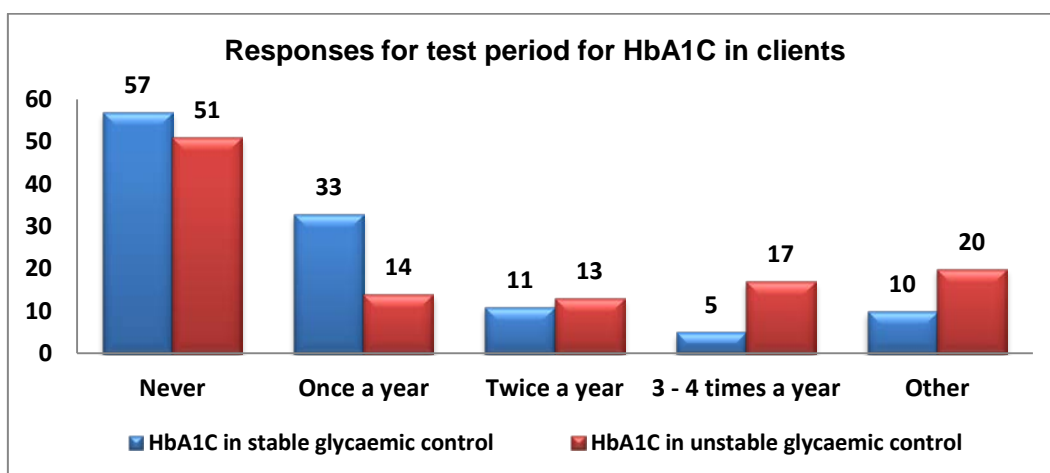


Chart 4.7b: Test period for HbA1C in clients with stable versus unstable glycaemic control

#### 4.7.2 Monitoring and supervision of risk factors in clients with diabetes

This subsection includes information on the BMI level used to determine if an adult is overweight and whether respondents monitor for hypertension and dyslipidaemia in their clients with diabetes. One hundred and eighteen (n=118; 93.7%) respondents provided information in relation to what BMI they used to determine if an adult was overweight. Eighty-two (n=82; 69.5%) respondents indicated a BMI of more than 25 kg/m<sup>2</sup>, followed by 22 (18.6%) respondents that indicated a BMI of more than 30 kg/m<sup>2</sup>. Five respondents (n=5; 4.2%) indicated they did not know what BMI was used to determine if an adult is overweight.

One hundred and twenty (n=120; 95.2%) respondents provided information on the monitoring of hypertension and dyslipidaemia in clients with diabetes. One hundred and nineteen (n=119; 99.2%) respondents indicated they monitored for hypertension, while less than half the respondents (n=57; 47.5%) monitored for dyslipidaemia in clients with diabetes. Fifty-five (n=55; 45.8%) respondents indicated they did not monitor for dyslipidaemia and eight (6.7%) respondents did not know if clients with diabetes were monitored for dyslipidaemia.

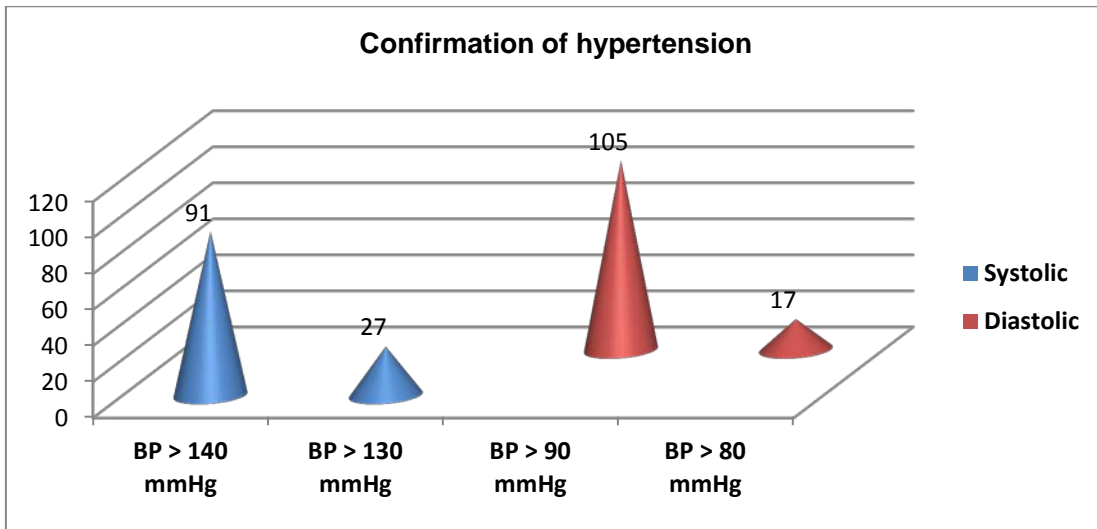
In response to the open-ended question where respondents were asked to provide reasons why dyslipidaemia was not monitored, 47 respondents provided information while 22 respondents did not respond at all. Similar reasons were classified into groups which were named. Table 4.7b presents the number of responses received per group, listed from highest to lowest, not in order of priority.

**Table 4.7b: Responses for reasons why dyslipidaemia is not monitored**

Reasons	Responses
Referral	12
Service-related	12
No resources	10
Cost	7
Medical aid	5
Lack of knowledge	4
Other	4
Non-response	22

The highest responses (n=12) were for referral and service-related reasons, followed by no resources (n=10).

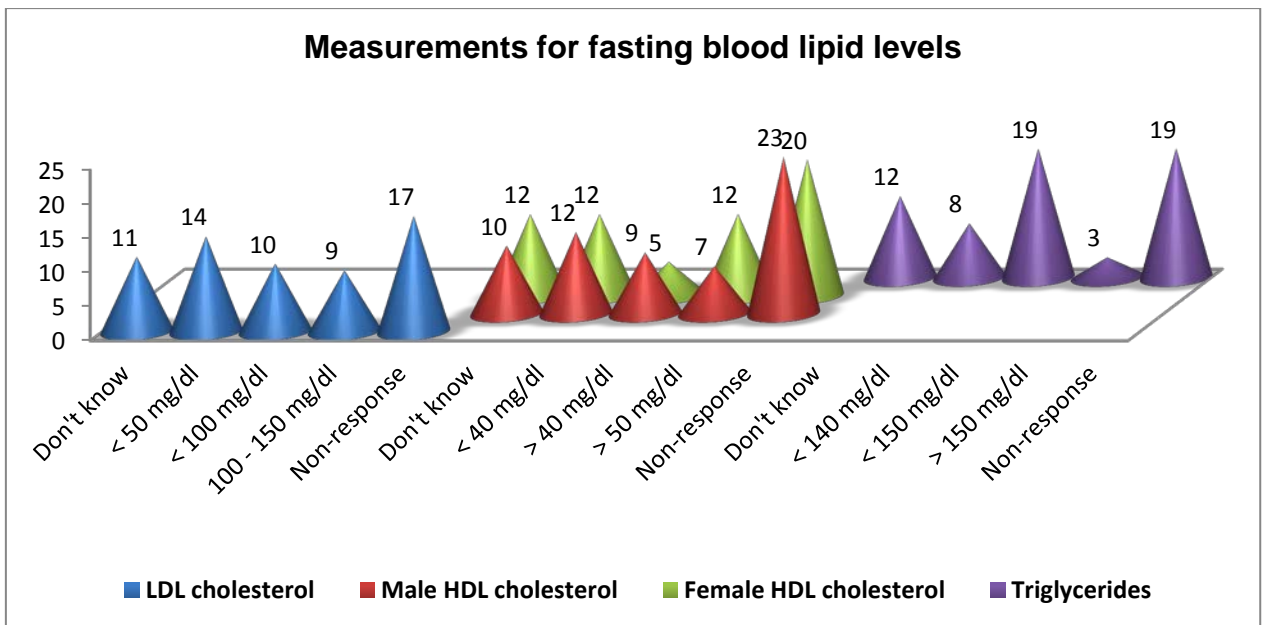
Chart 4.7c presents systolic and diastolic measurements respondents utilised when confirming hypertension in clients with diabetes. Of the 118 respondents that provided information on the systolic measurement utilised to confirm hypertension, 91 (77.1%) respondents indicated a systolic blood pressure greater than 140mmHg while 27 (22.9%) respondents indicated a systolic blood pressure greater than 130mmHg. Of the 122 respondents that provided information on the diastolic measurement utilised to confirm hypertension, 105 (86.1%) respondents indicated a diastolic blood pressure greater than 90mmHg while 17 (13.9%) respondents indicated a diastolic blood pressure greater than 80mmHg.



**Chart 4.7c: Responses for confirmation of hypertension**

One hundred and eighteen (n=118; 93.7%) respondents provided information in relation to how often fasting blood lipid profiles were measured in clients with diabetes. Sixty-five (n=65; 55.1%) respondents never measured lipid profiles, 45 (38.1%) respondents measured fasting blood lipid profiles annually while 8 (6.8%) respondents measured lipid profiles at other time periods, for example on request, six monthly or every 2-3 years.

Chart 4.7d presents the information provided by respondents (n=61) on the measurements for fasting blood levels for LDL cholesterol, HDL cholesterol in both men and women, and Triglycerides.



**Chart 4.7d: Measurements for fasting blood lipid levels**

The highest numbers of responses for each fasting blood lipid level were as follows. Fourteen (n=14, 26.4%) respondents accepted measurement of less than 50 mg/dl as the normal fasting level for LDL cholesterol while 12 (22.6%) respondents accepted less than 40 mg/dl as the normal fasting level for HDL cholesterol in males. For female clients, an equal number (n=12; 22.6%) of respondents accepted the measurement of less than 40 mg/dl and greater than 50 mg/dl as the normal fasting level for HDL cholesterol, while another 12 (22.6%) indicated they 'did not know'. Nineteen (n=19; 42.2%) respondents accepted measurement of less than 150 mg/dl as the normal fasting level for triglycerides. The non-response rate was highest for HDL cholesterol measurement in males (n=23; 37.7%) followed by the HDL cholesterol measurement in females (n=20; 32.8%). Additional information provided by 13 respondents was inconsistent as these respondents had indicated earlier that they did not measure fasting lipid profiles in clients with diabetes. Information from these 13 respondents was not included in the analysis.

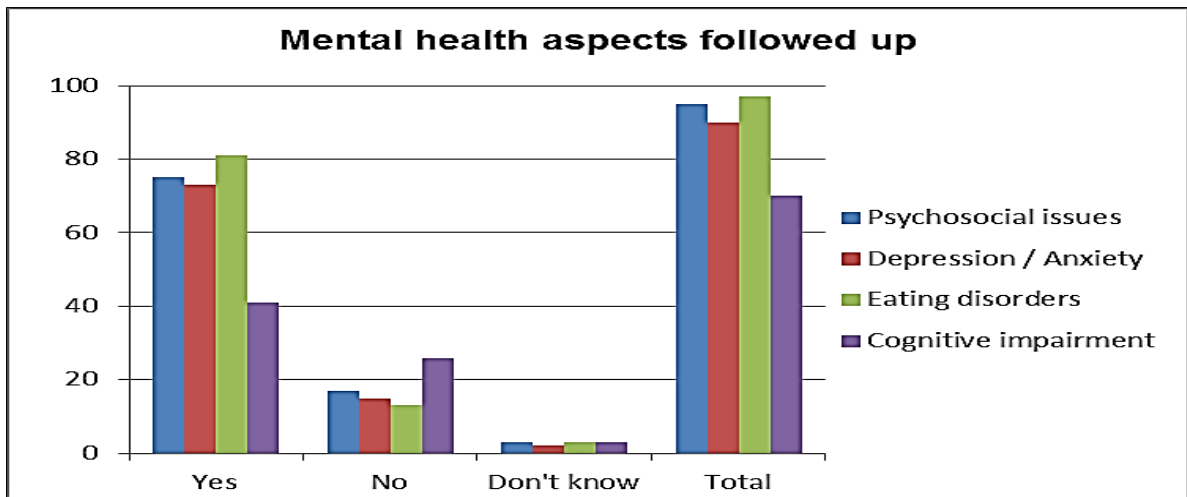
#### **4.7.3 Monitoring and supervision of mental health status of clients with diabetes**

Table 4.7c and Chart 4.7e indicate the mental health care aspects the respondents followed up on in relation to diabetes. Ninety-seven (n=97; 77%) respondents provided information on eating disorders but 29 (23%) did not. Eighty-one (n=81; 83.5%) respondents followed up on eating disorders, 13 (13.4%) respondents did not and 3 (3.1%) respondents did not know if eating disorders were followed up. A total of 95 (75.4%) respondents provided information on psychosocial issues, while 31 (24.6%) did not. Seventy-five (n=75; 78.9%) respondents followed up on psychosocial issues, 17 (17.9%) respondents did not and 3 (3.2%) respondents did not know if psychosocial issues were followed up. Of the total number (n=90; 71.4%) of respondents that provided information on depression and anxiety, 73 (81.1%) followed up on depression and anxiety and 15 (16.7%) did not.

The lowest number (n=70; 55.6%) of responses was received for cognitive impairment. Forty-one (n=41; 58.6%) respondents followed up on cognitive impairment, 26 (37.1%) respondents did not and 3 (2.4%) respondents did not know if cognitive impairment was followed up in clients with diabetes. Additional information was provided by 6 respondents on other mental health care aspects however the responses were inconsistent. The responses did not specify which mental health aspects were followed up and were not included in the analysis. Some of the inconsistent information provided were: *"all abnormalities are referred; anything that describes mental illness; not as routine request by Dr; referral to Employee Assistance Program; where applicable we follow up; and refer to our EAP called ICAS where needed"*.

**Table 4.7c: Mental health aspects followed up**

Mental health care aspects	Responses			
	Yes	No	Don't know	Total
Eating disorders	81 (83.5%)	13 (13.4%)	3 (3.1%)	97
Psychosocial issues	75 (78.9%)	17 (17.9%)	3 (3.2%)	95
Depression/Anxiety	73 (81.1%)	15 (16.7%)	2 (2.2%)	90
Cognitive impairment	41 (58.6%)	26 (37.1%)	3 (2.4%)	70



**Chart 4.7e: Mental health aspects followed up**

#### **4.8 Provision of continuity of care for clients with diabetes in the workplace**

This subsection describes the health care facilities and providers used by clients with diabetes, annual examinations performed on clients with diabetes and types of health professionals utilised on-site. Furthermore, the use of an annual influenza vaccine and identification tool will be described.

##### **4.8.1 Health care facilities and providers used by clients with diabetes**

This subsection deals with health care facilities that clients with diabetes attended the main health care giver for clients with diabetes, and where clients with diabetes received their medication. One hundred and twenty-two (n=122; 96.8%) respondents indicated which health care facilities clients with diabetes attended. Fifty-one (n=51; 41.8%) respondents indicated Local clinic/Community Health Centre and 31 (25.4%) respondents indicated clients visited a Private Practitioner. Fifteen (n=15; 12.3%) respondents indicated clients with diabetes attended the Occupational Health Clinic/Centre. Twenty-three (n=23; 18.9%) respondents indicated their clients attended a combination of health care facilities, for example, Local clinic/Community Health Centre and Private Practitioner or Local clinic/

Community Health Centre, Private Practitioner and Occupational Health Clinic/Centre. (See Chart 4.8a)

In total, 122 (96.8%) respondents provided information in relation to who was the main health care provider for clients with diabetes. Fifty-seven (n=57; 46.7%) respondents indicated a General Practitioner/Physician and 36 (29.5%) respondents indicated the OHNP/OMP. Twenty-nine (n=29; 23.8%) respondents indicated other health care providers, for example, the Local clinic/Community Health Centre or a combination of the OHNP/OMP and the General Practitioner.

Of the 122 (96.8%) respondents that provided information on where clients with diabetes obtained their medication, 53 (43.4%) respondents indicated Local clinic/Community Health Centre and 28 (23%) respondents indicated a Private Practitioner (General Practitioner/Physician). The lowest number (n=9; 7.4%) of responses received indicated the OHNP/OMP provided medication for clients with diabetes. A combination of responses were received from 32 (26.3%) respondents who indicated, for example, that the Local clinic/Community Health Centre and Private Practitioner or the Local clinic/Community Health Centre and OHNP/OMP provided medication for clients with diabetes. Chart 4.8a reflects the health facilities attended by clients with diabetes and where clients with diabetes obtained their medication.

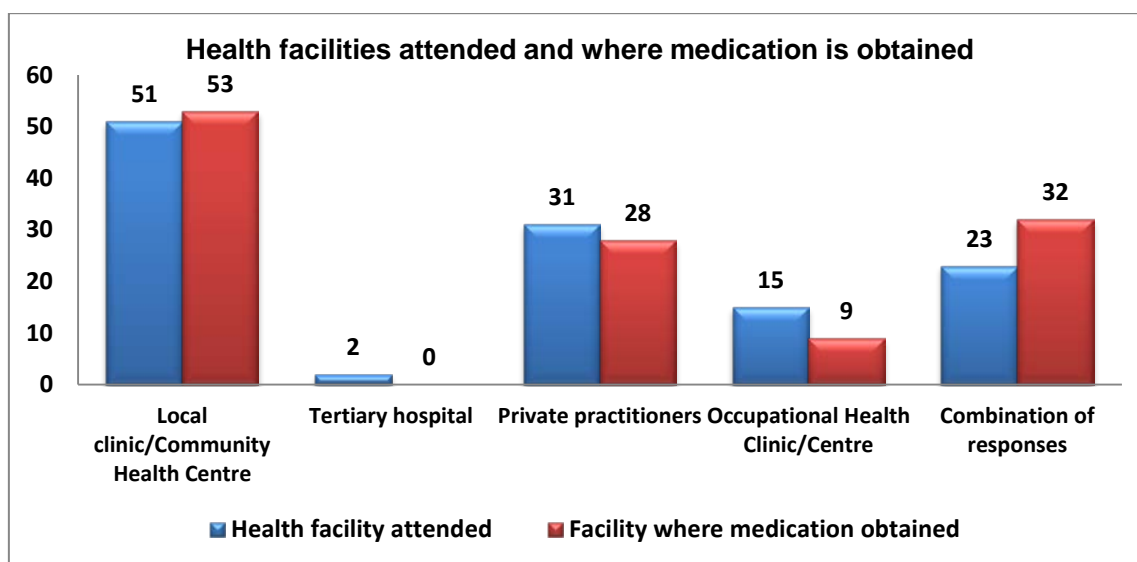


Chart 4.8a: Health facilities attended and where medication is obtained

#### 4.8.2 Annual examinations performed on clients with diabetes

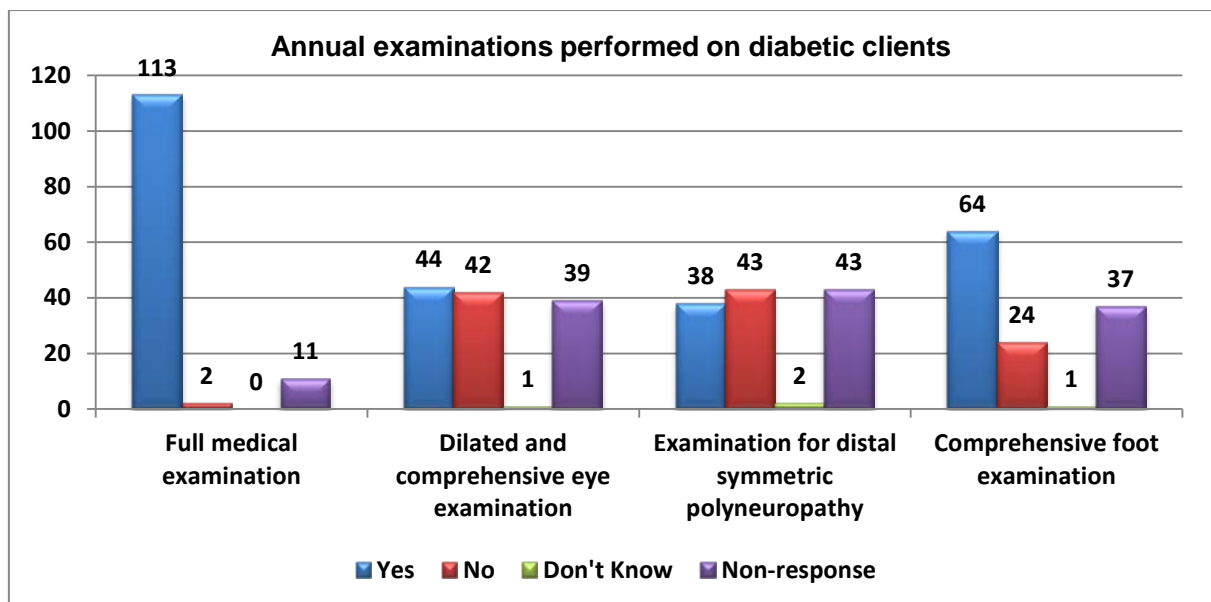
Table 4.8a and Chart 4.8b provide information on which annual examinations were performed to assess the health status of and detect any complications in clients with



diabetes in the workplace. Out of a total of 115 (91.3%) responses, 113 (89%) performed a full medical examination while 2 (1.6%) did not. Sixty-four (50.8%) respondents, out of a total of 89 (70.6%), performed a comprehensive foot examination but 24 (19%) respondents did not. Eighty-seven (n=87; 69%) respondents provided information on whether a dilated and comprehensive eye examination was performed. Of these 87 respondents, 44 (34.9%) did perform the examination while 42 (33.3%) did not. The lowest number (n=83; 65.9%) of responses was for examination for distal symmetric polyneuropathy. Although 38 (20.2%) respondents did perform this examination, more respondents (n=43; 34.1%) did not. The highest non-response rate (n=43; 34.1%) was also for examination for distal symmetric polyneuropathy.

**Table 4.8a: Annual examinations performed on clients with diabetes**

Annual examinations performed	Number of responses			
	Yes N (%)	No N (%)	Don't Know N (%)	Non- response N (%)
Full medical examination	113 (89.7%)	2 (1.6%)	0 (0%)	11 (8.7%)
Comprehensive foot examination	64 (50.8%)	24 (19%)	1 (0.8%)	37 (29.4%)
Dilated and comprehensive eye examination	44 (34.9%)	42 (33.3%)	1 (0.8%)	39 (31%)
Examination for distal symmetric polyneuropathy	38 (30.2%)	43 (34.1%)	2 (1.6%)	43 (34.1%)



**Chart 4.8b: Annual examinations performed on clients with diabetes**

Additional information was provided by five respondents on other annual examinations that were performed. One respondent indicated a urine and random HGT was performed and

another respondent indicated that clients were referred to a podiatrist and ophthalmologist. The remaining three responses were inconsistent and were not included in the analysis.

Fifty-eight (n=58) respondents provided information in response to the open-ended question of why annual examinations were not performed. Similar responses were grouped together to aid in the presentation and analysis of responses. Table 4.8b presents the reasons why annual examinations were not performed. The reasons are listed from the highest to lowest number of responses with other reasons being listed last.

**Table 4.8b: Responses for reasons why annual examinations were not performed**

Reasons	Responses
Lack of resources	21
Service-related	18
Lack of knowledge/skills/training	15
Referral	12
Medical aid	8
Other	4

Lack of resources (n=21) was the highest reason why annual examinations were not performed. This group includes responses such as: *“no equipment, time constraints, too costly, no facilities, no staff, and client does not pay”*. The next highest reason, service-related (n=18), included responses of: *“only medicals and fit to work assessments done; no occupational health clinic only wellness day; focus on family planning; no PHC; contract worker so not sure if OMP does it, Dr examines patient, not part of job description or code of practice; and outside service providers needed or used”*. Fifteen (n=15) respondents indicated that lack of sufficient knowledge, skills and specialist training was a reason why annual examinations were not performed. Lack of specialist training included how to perform examinations such as dilate the pupil of the eye, comprehensive eye examinations and test for distal symmetrical polyneuropathy. Other responses regarding lack of knowledge or skills included: *“not trained to do these examinations, are the examinations necessary in an occupational setting, skill not attained, didn’t know it should be done”*. Referral (n=12) included clients being referred to: *“physician/doctor, GP, Optometrist/Ophthalmologist and/or to own medical aid or local clinic”*. Other reasons for referral were that clients were managed and treated at local clinics and Community Health Centres. Eight (n=8) respondents indicated that their clients were on medical aid and were treated privately by own doctors and GPs. A further 5 respondents listed other reasons, one being: *“no excuse, should do foot exam”*. The other 4 respondents provided inconsistent information which was not included in the analysis, for example, *no lab screening, to diagnose and refer, not risk-based and no assistance from local clinic*.

### 4.8.3 Types of health professionals utilised on-site

Table 4.8c presents the types of health professionals that respondents utilised on-site. The health professional that was used most was the optometrist (n=55; 43.7%), followed by the physician (n=47; 37.3%) while the ophthalmologist (n=5; 4%) was the health professional least used. The non-response rate was 50% for the ophthalmologist, podiatrist and sports scientist/personal trainer. Additional information was provided by 20 respondents (15.9%) on other health professionals utilised on-site including OMP, biokineticist, EAP and wellness service provider, social worker, and/or clients are referred.

**Table: 4.8c Types of health professionals utilised on-site**

Types of health professionals	Number of responses			
	Yes N (%)	No N (%)	Don't know N (%)	Non-response N (%)
Ophthalmologist	5 (4%)	57 (45.2%)	1 (0.8%)	63 (50%)
Optometrist	55 (43.7%)	34 (26.9%)	1 (0.8%)	36 (28.6%)
Physician	47 (37.3%)	39 (31%)	0	40 (31.7%)
Podiatrist	7 (5.5%)	55 (43.7%)	1 (0.8%)	63 (50%)
Dietician	24 (19%)	49 (38.9%)	2 (1.6%)	51 (40.5%)
Diabetes educator	19 (15%)	51 (40.5%)	1 (0.8%)	55 (43.7%)
Sports scientist/Personal trainer	8 (6.3%)	54 (42.9%)	1 (0.8%)	63 (50%)
Mental health professional	18 (14.3%)	51 (40.5%)	1 (0.8%)	56 (44.4%)

### 4.8.4 Influenza vaccine and identification tool

One hundred and twenty (n=120; 95.2%) respondents provided information in relation to the influenza vaccine. Seventy-six (n=76; 63.3%) respondents indicated that the vaccine was offered annually to clients with diabetes, 42 (35%) respondents said the vaccine was not offered and 2 (1.7%) did not know if the vaccine was offered. A total of 38 (79.2%) respondents provided additional information on why an annual flu vaccine was not offered. Reasons given for not administering the vaccine included *“costs and budget constraints”* (n=10); company decision (n=6) for example *“would nor purchase, management not interested or not part of policy or contract with company and consider it the client’s responsibility”*; client decision (n=4) for example *“client doesn’t allow, on request and clients reluctant to take”*; clients have medical aid or see private doctors (n=6); and service-related, for example *“don’t do vaccines, mobile service only, no medication at the clinic, clients are referred and clinic does not provide PHC (n=8)”*. Four (n=4) responses were inconsistent and were not included in the analysis.

Seventy-four (n=74) respondents provided information on what percentage of clients with diabetes accepted the influenza vaccine. Thirty-nine respondents (n=39: 52.7%) indicated between 0-30% of clients with diabetes accepted the influenza vaccine, 19 respondents

(25.7%) indicated 31-60% and 16 respondents (21.6%) indicated more than 60% of clients with diabetes accepted the influenza vaccine. An additional 14 respondents provided information however the information was inconsistent as these respondents had indicated earlier that they did not provide the influenza vaccine. These 14 responses were not included in the analysis.

Additional information was provided by 47 respondents on reasons that clients with diabetes did not accept the influenza vaccine. The reasons included *“costs to clients if they have to purchase the vaccine, clients refuse to buy the vaccine themselves, clients’ lack of knowledge, clients’ fear and perception of negative effects of the vaccine, clients use private doctors if they have medical aid or personal preference of clients”*. Other reasons given by respondents are *“clients can get sick leave if they get flu and they like to use their sick leave, clients’ fear of injections, and vaccine not available”*.

One hundred and twelve (n=112; 88.9%) respondents provided information in relation to clients’ use of a diabetic identification tool. One hundred and two (n=102; 91.1%) respondents indicated that less than 25% of clients with diabetes used an identification tool like a medic alert bracelet, 5 (4.5%) respondents indicated 25-50%, 3 (2.7%) respondents indicated 51-75% and 2 (1.8%) indicated more than 75% of respondents used an identification tool. Seventy-seven respondents (n=77) provided reasons why clients do not use an identification tool including, amongst others, *“cost and financial constraints”* (n=31); *“don’t know, never offered it, didn’t know it was recommended, not investigated, or we do not monitor; are motivated to purchase”* (n=13); client’s choice – *“don’t want to use it as it marks that something is wrong, not interested, lack of buy-in from general population, do not apply regardless of information”* (n=10); work restrictions (n=5); *“few clients, clients seen once a year and other (clients are counselled but GP should give it, I think they have just not ordered one, usually do on own but too lazy to do forms)”* (n=5). Of the two respondents that indicated clients have ID cards in purses or bags, one respondent had created the card for the client.

#### **4.9 Respondents’ management of diabetes in the workplace**

This subsection deals with a diabetes management programme, guidelines used by respondents, interventions respondents consider most important in the care of clients with diabetes, respondents’ personal views on statements of their practice, strategies implemented in diabetic management programmes and barriers experienced by respondents in management of clients with diabetes in the workplace.

#### 4.9.1 Diabetes management programme

One hundred and twenty (n=120; 95.2%) respondents indicated whether they have a diabetes programme in place. Sixty percent (n=72; 60%) of respondents indicated they do have a diabetes management programme in place, leaving 48 (40%) respondents that did not. Forty-two respondents (n=42; 87.5%) provided information on why no diabetes management program was in place with the main reasons being type of service offered, clients are monitored and referred, and no PHC service was offered (n=18). Other reasons provided were: constraints, for example no time, workload and budget (n=7); client-related reasons for example few clients, clients seen once a year only or on one-to-one basis; clients are seen privately (n=4); and personal reasons (n=5), for example, *“haven’t thought about it and lack of information, need to put in place and not implemented”*.

Additional information was provided by 67 (93.1%) respondents in response to the open-ended question of what aspects were included in respondents’ diabetes management programmes. Similar responses were grouped together for ease of presentation and analysis, (see Table 4.9a).

**Table 4.9a: Responses for aspects included in diabetes management programmes**

Aspects	Responses
Health education/Wellness	39
Monitoring	37
Glycaemic control	35
Diet control	34
Referrals	25
Medication	16
Foot and Eye care	16
Psychological/Self-management	15
Screening	9
Physical activity	9
Risk factors	9
Management	8
Complications	6
Lifestyle modification	5
Illness treatment	3
Other	6

Thirty-nine (n=39) respondents cited health education/wellness as an aspect, which referred to the use of booklets, brochures, pamphlets, DVDs, info/talk sessions, on-line e-care and newsletters. Some of the topics covered were hygiene, prevention, treatment management and wellness. Thirty-seven (n=37) respondents indicated monitoring as an aspect that was included in the diabetes management programmes. This refers to follow up of clients, medicals, follow up of compliance and general health, monthly reviews, laboratory tests and record of treatment regimes. Responses for glycaemic control (n=35) included daily or

monthly checking of glucose levels, HbA1C tests, health education on hyperglycaemia and hypoglycaemia and urine testing. Responses on aspects relating to lifestyle were as follows: diet control (n=34), physical activity (n=9) and lifestyle modification (n=5). The responses to lifestyle aspects included health education and information, advice on stopping alcohol and smoking, wellness counselling and promotion, and advice on exercise programmes. Two respondents had on-site gyms and one had a biokineticist. Respondents (n=25) referred clients to specialists, such as dieticians, social workers, for optometry and ophthalmology, as well as to GPs and local clinics. Medication (n=16) included *“education and discussions on medication compliance, use of sugar-free medicines, and clients started on medication or referred”*.

Sixteen (n=16) respondents listed foot and eye care which included health education on foot care, eye tests and foot examinations, and the use of soft safety shoes. Psychological/self-management (n=15) referred to counselling, family assistance/support, EAP, discussion groups, appointments with psychologists and empowering employees. Clients were also encouraged to keep CHC appointments and return dates. The responses relating to screening (n=9) included annual screens, vital signs, annual eye tests, medicals, and annual blood glucose. Risk factors (n=9) referred to annual cholesterol and blood pressure testing; and weight, waist and BMI measurements. The responses for complications (n=6) included health education on signs and prevention, treatment, monitoring, and prevention. Management (n=8) referred to aspects relating to respondents own management of clients with diabetes including early identification and intervention, prevention and management, fitness for work criteria, workplace assessment, goals, and health risk management plan. Three (n=3) respondents listed illness treatment which included wound management and infection prevention and one respondent listed an annual influenza vaccine. Six (n=6) respondents indicated other aspects including register on medical aid chronic disease programme, not being managed by me, help with temporary/total incapacity, collect chronic medication from local clinic, peer group advice, and use of EDL. Additional information provided by 3 respondents was inconsistent as respondents had indicated previously that they did not have a diabetes management programme, and were not included in the analysis.

Additional information was provided by 44 (61.1%) respondents in response to the open-ended question of what additional aspects respondents would like to include in their diabetes management programmes in the future, (see Table 4.9b). The highest number (n=35) of responses received was for specialist services. This referred to the use of specialists such as dietician, specialist nurse, podiatrist, educators and specialist speakers, diabetic counsellor, ophthalmologist and optometrist as well as for HbA1C tests. Responses for special care

(n=10) included monitoring diet and healthy eating, sports activities/exercises and foot care. Family/Support (n=7) referred to “*children in communities, educate whole family, support from family, diabetic clubs, liaison with peers*”. Five (n=5) respondents indicated training as an aspect, for example “*for eye examination, regular update on management, protocols in district health service plan, guidelines for practice and improving health care education for health professionals*”. The service/constraints aspects (n=5) included “*PHC needed, more monitoring, no time or money for it and production constraints*”. Four (n=4) respondents mentioned education as an aspect to be included, for example “*teaching presentations, diabetic talks and self-management education*”. Other aspects (n=10) that were listed included “*job concessions for diabetic drivers, medical ID bracelet, the strategies as discussed in point 4.9.5, diabetic cards, behaviour change, liaison with DOH, canteen with affordable diet, monthly monitoring, individual glucometers, and cannot think now*”.

**Table 4.9b: Responses for additional aspects to be implemented in diabetes management programmes**

Additional aspects	Responses
Specialist services	35
Special care	10
Family/Support	7
Training for OHNPs	5
Service/Constraints	5
Education	4
Other	10

#### **4.9.2 Guidelines used by respondents to manage diabetes**

One hundred and twenty-one (n=121; 96%) respondents provided information on whether a guideline was used for managing clients with diabetes. Forty (n=40; 33.1%) respondents indicated they used guidelines while 81 (66.9%) respondents did not have a guideline.

Table 4.9c presents information from respondents (n=34) on what the guideline was and/or who the compiler/publisher was. Ten (n=10) respondents indicated they used company guidelines, 17 respondents indicated they used guidelines from the Department of Health and 14 respondents used other guidelines. The Standard Treatment Guidelines and Essential Medicines List 2008 (n=15) and Primary Clinical Care Manual (n=8) were the guidelines most used, followed by company protocols (n=4). The respondents also gave information on where the guidelines were obtained including: “*after training attended, from the Department of Health, from local clinics and from colleagues and companies where they worked*”.

**Table 4.9c: Information on guidelines provided by respondents**

Type of guideline	Name of guideline	Compiler/Publisher	Responses
Company guidelines	COF Guidelines and standards	Workplace Dr	1
	Clinic management	OHNP/OMP	1
	Company SOPs, protocols and requirements	Own company	4
	OMP Fitness to work guidelines	OMP	1
	Diabetes and employment	Life Healthcare	1
	SOP	Clicks	1
	Electronic medical surveillance program	Synergiee	1
Department of Health	DOH manual	DOH	1
	Guideline for diabetes		1
	Standard Treatment Guidelines and Essential Medicines List 2008	DOH	15
Other guidelines	Guideline for job placement	SIMRAC	1
	DiabetesDek Patient information and guidelines	Johnson & Johnson	1
	So you have Diabetes	Johnson & Johnson	1
	Centre of Diabetes and Endocrinology guideline	CDE	1
	Primary Clinical Care Manual	Jacana	8
	Living with diabetes	Roche	1
	Medical requirements to drive	SASOHN	1

\*\* Combinations of guidelines were used by some respondents

Thirty-eight (n=38) respondents provided additional information on whether the guideline they used provided all the information needed to implement a diabetes management programme. Twenty-one (n=21; 55.3%) respondents agreed that the guidelines provide all the information they needed while 12 (31.5%) respondents indicated the guidelines did not provide all the information needed. Five (n=5; 13.2%) respondents were unsure that the guideline provided the information they needed.

Respondents were required to indicate whether a guideline, that provided instructions and interventions for the management of diabetes, would be useful in the workplace. Of the 81 respondents that did not have a guideline, 40 (49.4%) strongly agreed and 29 (35.8%) agreed that such a guideline would be useful. An additional 10 respondents, that were not required to answer (previously indicated they had a guideline) also provided information. Six respondents (n=6) strongly agreed, 2 respondents agreed, 1 respondent was unsure and 1 respondent strongly disagreed that a guideline would be useful.

#### **4.9.3 Interventions respondents considered most important**

Ninety-eight (n=98; 77.8%) respondents provided information in response to the open-ended question on what aspects of care they considered most important for their clients with diabetes. Similar responses were grouped together and categorised into interventions. Table



4.9d presents the responses for what the most important aspects of care were. The numbers of responses are listed from highest to lowest, not in order of priority, and other aspects are listed last.

**Table 4.9d: Responses for most important aspects of care**

Aspects of care	Responses	Percent
Diet	54	55.1%
Medication	45	45.9%
Lifestyle	36	36.7%
Monitoring	36	36.7%
Risk factors/Complications	35	35.7%
Foot/Eye care	29	29.6%
Health education	28	28.6%
Exercise	24	24.5%
Self-management of clients	24	24.5%
Psychological	20	20.4%
Personal	19	19.4%
Service	7	7.1%
Hygiene	6	6.1%
Benefits	3	3.1%
Other	14	14.3%

The highest number of responses was for diet (n=54), followed by medication (n=45) as important aspects of care. Included in the category of diet were responses such as *“education, manage control and adherence to diets, and info about diet and eating plans”*. Responses included in medication were *“proper use and storage of, compliance, manage control, identify side effects, info on, treatment plan and follow up”*. The category lifestyle (n=36) referred to responses such as *“monitoring and adaptation; education about smoking, alcohol and stress management; and knowledge and modification of lifestyle”*. Thirty-six (n=36) responses were received for monitoring which referred to *“follow up visits, annual examinations, blood glucose monitoring and urine tests, HbA1C tests, general check-ups and regular contact with GP”*. The category risk factors/complications (n=35) included responses like *“blood glucose control, signs of hyperglycaemia and hypoglycaemia, weight/waist and BMI monitoring and control, identification and knowledge, associated illnesses e.g. high blood pressure and cholesterol, and specialist visits”*.

Twenty-nine (n=29) respondents listed foot/eye care, including information about foot/eye care, as important aspects of care. Health education, through various methods and on different topics related to diabetes, was listed by 28 respondents as an important aspect of care. Regular exercise and education about exercise was listed by 24 respondents. The category self-management of clients (n=24) included responses such as *“understanding and control of and participation in the management of diabetes; daily self-monitoring; compliance and maintenance; and self-help, self-reliance and self-responsibility”*. Psychological aspects

(n=20) referred to *“family awareness and understanding, support groups, family inclusion, emotional health, counselling, and motivation”*. Seventeen (n=17) respondents listed personal aspects as being important including *“open door policy, comprehensive management, business strategy of linking performance KPAs to healthy lifestyle, constant assistance and control, patience and listening skills, step by step approach, screening, and practice and knowledge”*. Service aspects (n=7) referred to responses such as *“regular clinic days, only monitoring and referral, wound care, and improved budget for on-site medication and lab screening”*. Six (n=6) respondents referred to personal hygiene, including foot care, and education regarding hygiene.

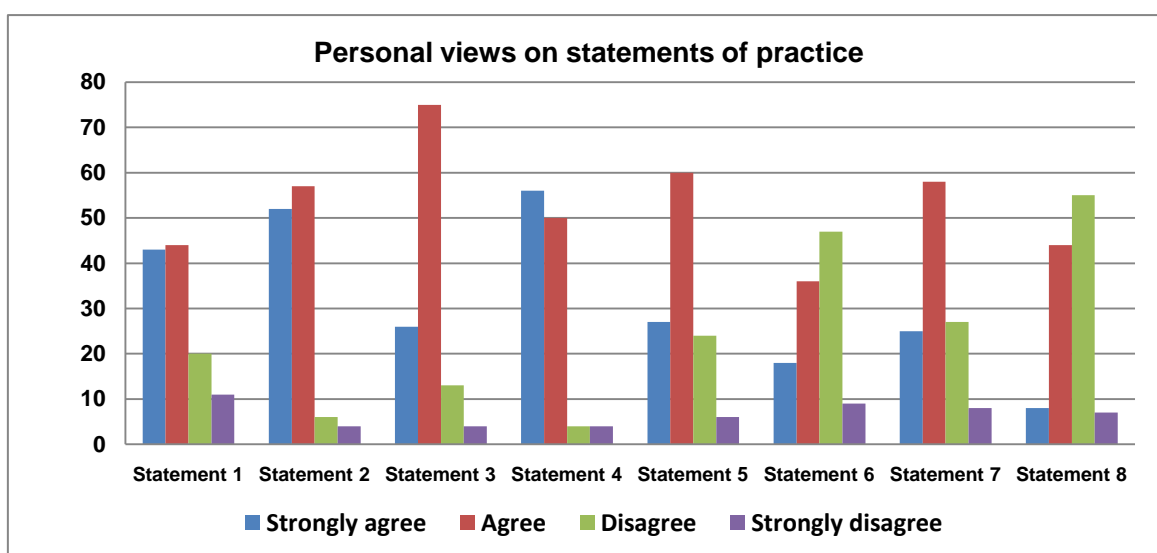
The 3 respondents that mentioned benefits listed *“medical aid, treatment compliance benefits and to understand funding”* as aspects that were important. The other aspects (n=14) that were considered important included responses such as *“uncontrolled client will be temporary, the strategies listed in point 4.9.5, monitor sick leave, sharing test results, ID bracelet, screening/diagnostic tools, IOD and healing time, client should understand the importance of PHC, not to only focus on OHC, definitions of tests available, preventing injuries, skin and dental care, financial costs of special diets, improved canteen facilities, and cold chain on treatment”*.

#### **4.9.4 Personal views on own practice**

Respondents were required to state personal views on specific statements that were made relating to their practice in managing diabetes. The statements were numbered from one to eight for ease of analysis. Table 4.9e and Chart 4.9a present the number of responses for each of the eight statements. Most respondents agreed on statement one (n=44), statement two (n=57), statement three (n=75), statement five (n=60) and statement seven (n=58). Fifty-six (n=56) respondents strongly agree on statement four. Most respondents disagreed on statement six (n=47) and statement eight (n=55). Few respondents strongly disagreed on any of the statements.

**Table 4.9e: Personal views on statements of practice**

No.	Statements of practice	Personal views			
		Strongly agree	Agree	Disagree	Strongly disagree
1	The important decisions regarding daily diabetes care are made by the client with diabetes	43	44	20	11
2	Your health care professionals help clients with diabetes to make informed choices about their care plans	52	57	6	4
3	The emotional effects of diabetes are considered significant	26	75	13	4
4	The client with diabetes is considered the most important member of the diabetes care team	56	50	4	4
5	Your clients with diabetes are well-informed about their condition	27	60	24	6
6	You find it frustrating to assist clients with diabetes to take care of their condition	18	36	47	9
7	Clients with diabetes have the right to decide how hard they will work to control their blood glucose	25	58	27	8
8	Your clients with diabetes are not supported by their family and friends	8	44	55	7



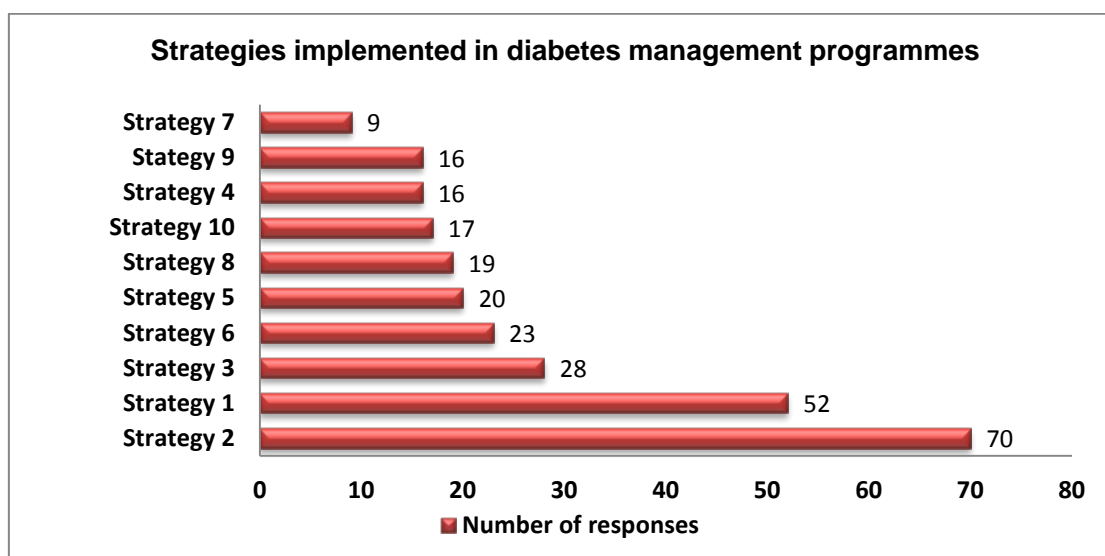
**Chart 4.9a: Personal views on statements of practice**

#### 4.9.5 Strategies implemented in diabetic management programmes

Table 4.9f presents the strategies, numbered one to ten, implemented by respondents in their diabetic management programmes and the number of responses received. The highest number of responses were received for strategy two (n=70; 56.9%) followed by strategy one (n=52; 42.3%). The number of responses are much lower for strategy three (n=28; 22.4%), strategy six (n=23; 18.4%) and strategy five (n=20; 16%). The lowest number (n=9; 7.3%) of responses received was for strategy seven. Two respondents (n=2) indicated other strategies were implemented namely Medical Aid Case managers and monthly evaluations. See Chart 4.9b for the responses presented from lowest to highest.

**Table 4.9f: Strategies implemented in diabetic management programmes**

No.	Strategies	Responses N (%)
1	Improving the health care education of health professionals through in-service training	52 (42.3%)
2	The delivery of diabetes self-management education	70 (56.9%)
3	The adoption of guidelines for practice	28 (22.4%)
4	The use of checklists that mirror the guidelines used	16 (12.8%)
5	Quality improvement programmes	20 (16%)
6	The clustering of dedicated diabetes visits into specific times	23 (18.4%)
7	The organisation of visits to multiple health care professionals on a single day	9 (7.3%)
8	The implementation of tracking systems by means of electronic medical records	19 (15.1%)
9	The availability of case/care management services	16 (12.7%)
10	The availability and involvement of expert consultants on-site	17 (13.5%)



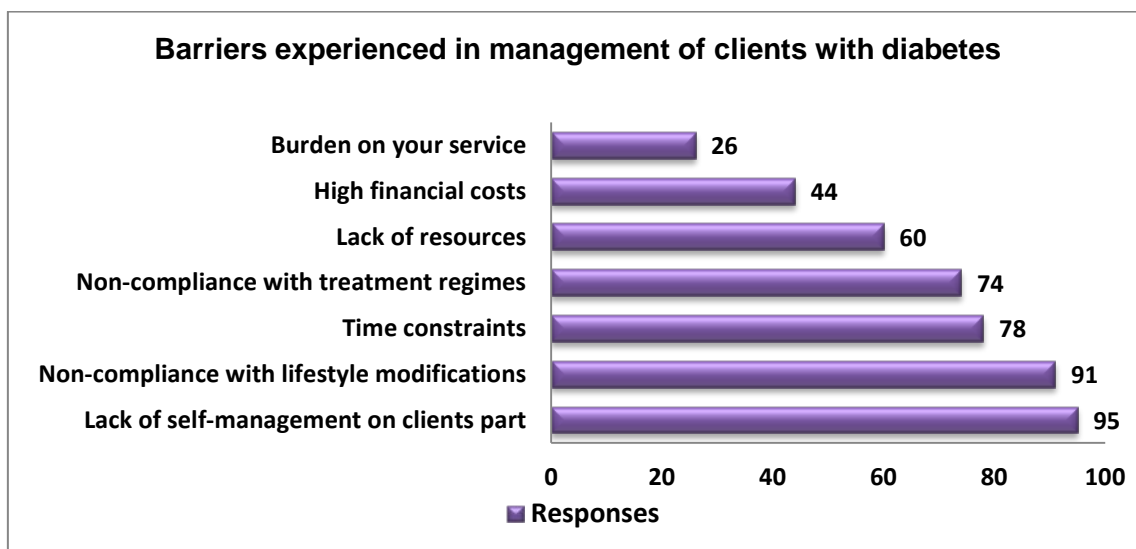
**Chart 4.9b: Strategies implemented in diabetic management programmes**

#### 4.9.6 Barriers experienced in management of clients with diabetics

Table 4.9g and Chart 4.9c reflect responses obtained in relation to barriers experienced in the management of clients with diabetes. Ninety-five (n=95: 75.4%) respondents indicated that lack of self-management on the part of the client was the largest barrier, followed by 91 (72.2%) respondents citing non-compliance with lifestyle modifications as a barrier. The lowest barrier experienced was that of a burden on service (n=26; 20.6%). Additional information was provided on other barriers experienced including: “*alcohol, visit clinic once a month, lack of assistance from clinics and clinics don’t review treatment, not a contract core function, and clients prefer own doctors*”.

**Table 4.9g: Barriers experienced in the management of clients with diabetes**

No.	Barriers experienced	Responses N (%)
1	Lack of self-management on the part of the client	95 (75.4%)
2	Non-compliance with lifestyle modifications	91 (72.2%)
3	Time constraints	78 (61.9%)
4	Non-compliance with treatment regimes	74 (58.7%)
5	Lack of resources	60 (47.6%)
6	High financial costs	44 (34.9%)
7	Burden on your service	26 (20.6%)



**Chart 4.9c: Barriers experienced in the management of clients with diabetes**

#### 4.10 Constraints and limitations

The constraints and limitations experienced by the researcher during the data capturing and analysis are described in this subsection.

#### **4.10.1 Constraints**

Hofstee (2006: 117-118) suggests the following process be followed to identify the constraints and limitations of the study. Firstly, brainstorming is used to identify how else the problem might have been tackled in order to reach a reliable conclusion about the thesis statement under discussion. Secondly, the advantages of each of these possible “ways” should be identified. Lastly, one should compare and match the results to the study that was conducted thereby identifying the constraints and limitations of the study conducted. The researcher undertook to use this process to identify the limitations for this study. The constraints that challenged and frustrated the researcher are as follows.

The focus of the study was too wide, too many variables were present resulting in a large volume of data that was difficult to manage and led to time constraints in completing the study. The study covered too wide a geographical area and would have been better suited to have a smaller region e.g. the Western Cape only. This would have enabled a greater ease of data collection and follow up of uncompleted questionnaires and decreased the volume of data.

Mouton (2001:104) affirms that a common error when constructing questionnaires is to make it too long. The researcher was aware that her questionnaire was long but retained some of the questions to collect information on the large number of variables and meet the objectives of the study. The constraint related to long questionnaire is that respondents can become bored with the questionnaire and stop answering it and/or leave out questions. Furthermore, respondents might not have considered the questions carefully enough. Some of the questions asked were not crucial to the study and could have been removed.

Respondents answered the questions incorrectly, possible due to misunderstanding the question or not completing the questionnaire due to the length and number of questions. If the researcher had had face-to-face contact with the respondents, this constraint could have been addressed immediately and given the researcher the opportunity to clarify questions first hand. Some of the questions would have been better suited as direct questions with limited choices rather than giving respondents the opportunity to add their own comments. Limit the questions to specific responses wanted to address objectives directly.

A disadvantage of using an electronic questionnaire is that some respondents did not have access to or use emails. Respondents did not receive the questionnaire due to email addresses being incorrect on the database.

Difficult questions that cannot be answered immediately should be excluded e.g. average age of employees, percentage of clients that maintain good glycaemic control. Other constraints were lack of personal contact with respondents for the pilot and main study therefore there was no opportunity to answer queries directly, to ensure questions were answered correctly to avoid inconsistencies; and to improve same-day collection of questionnaires that would have improved response rate.

Another constraint was that emails from respondents were “lost” amongst other work emails. Preferably, a separate email address should have been allocated so that the research assistant could work separately; so that only one person was managing and following up on emails to keep track of which were answered, etc. and that all communication regarding the study was in a central and independent mailbox for easy retrieval. This mailbox would also have alleviated the lack of control over the “undeliverable” emails and follow up of “out of office” emails. In future, a process could be developed to manage emails and data and keep better track of fieldwork e.g. utilising a codebook (Mouton, 2001:107).

Use of a different method of data collection/questionnaire distribution might have ensured a higher response rate; and focus group interviews would have elicited more direct and personal information from the respondents. The researcher realised the need for a dedicated assistant for selected periods in line with proposed timelines of the study. Lack of experience of the researcher and assistant in capturing data was also a concern. One person should have been used to capture the data and the other to validate that data, to reduce human error and inconsistencies. The time lost in recapturing data meant the study was prolonged resulting in further time constraints in completing the rest of the analysis, presentation of results and discussion of findings. A more permanent method of storing email correspondence, not in Groupwise, should have been implemented to prevent any potential loss of information and archived correspondence when the email engine migrated to Microsoft Outlook.

Although respondents had the opportunity to express own opinions, views, and concerns in the open-ended questions, these responses were difficult to analyse in this quantitative study. The researcher realised that she required more in-depth knowledge of the database as there were different categories of members; and there were inaccuracies in contact details of members which influenced the response rate and is a cause for concern. A different method of contacting OHNPs should be looked at.

#### **4.10.2 Limitations**

The first limitation was the low response rate of questionnaires returned, resulting in low numbers for comparison and few responses for provinces and organisations/industries. A higher response rate would have ensured a more representative sample of the population to enable generalisations to be made. In response to the sample of 1000 questionnaires sent, 134 were received. Out of 134, eight were discarded, leaving 126 as the final number of responses; this was a response rate of 12.6%

The second limitation was related to the questions respondents left unanswered on the questionnaire resulting in lower numbers of responses for some questions and limiting the statistical analysis that could be performed. Inconsistent information was provided by the respondents with particular reference to the questions that gave the respondent the option of choosing 'Other'. The inconsistent information also included ambiguous answers, respondents replied to questions that followed-on e.g. question numbers 3.11 and 5.10, when their previous answer negated the need to reply to the follow-on question.

More, in-depth statistical analysis was not performed as a result of inconsistencies in responses, the manner in which data was captured, and time constraints related to the study.

After reflection on the process of conducting this research, the following influencing factors were identified, namely: ....

- The inexperience of the researcher as a first-time researcher
- Better preparation and planning was required beforehand to minimise shortfalls
- Lack of knowledge of pitfalls in the research process led to the constraints identified
- Change of supervisors mid-study resulted in the title and objectives changing which redirected the focus of the study.



## CHAPTER FIVE: DISCUSSION

### 5.1 Introduction

This chapter will cover the interpretation and discussion of findings on demographics; organisations, employees and clients with diabetes; knowledge of OHNPs on diabetes and screening for diabetes in the workplace; practice of OHNPs of screening for diabetes in the workplace; practice of OHNPs of diagnosis and follow up of clients with diabetes in the workplace; monitoring and supervision of clients with diabetes in the workplace; provision of continuity of care for clients with diabetes in the workplace; and OHNPs' management of diabetes in the workplace. The discussion in the subsections of this chapter will follow the format of the results as presented in chapter four. Percentages have been rounded off for ease of discussion.

### 5.2 Demographics

One thousand (1000) questionnaires were emailed to respondents. A total of 134 questionnaires were returned of which eight (8) were discarded (see subsection 3.7.2). Of the final 126 respondents (see Table 3.8a), the majority were females (121) and only 5 were males. This distribution of more females than males is as is expected when reviewing the South African nursing population that has traditionally been predominantly female as reflected in the SANC statistics (SANC, 2012).

All 126 respondents provided information on their age (see chart 4.2a). It is evident that 49 respondents were between the ages of 51-60 while seven were above 60 years of age. This means that 39% are nearing or within 9 years of, their retirement age. Only 21 (17%) respondents were under age 40, while 48 (38%) were between 41-50 years. The lack of younger, and predominance of older, OHNPs is an issue of concern. Due to the lack of statistics it is not known how many new, younger nurses are entering the occupational health nursing field (Michell, 2011). This dearth of future OHNPs and no younger generation to fill the gap when older nurses retire is a concern. The knowledge, skills and experience of the older nurses working as OHNPs will be lost adding to the shortage of skilled nurses within the occupational health field (SAQA Qualification ID:59297).

The highest qualification amongst respondents (3) was a Master's. Thirty (30) respondents had a Bachelor of Technology degree, 16 had a Bachelor's degree, 37 had a Diploma, and 29 a Certificate. The highest number of OHNPs had either a Diploma or a Bachelor of Technology degree, closely followed by those OHNPs with a Certificate (see chart 4.2b). Ten (10) respondents indicated they had no qualification in occupational health which is cause for

concern as they are practicing in this specialty and working outside of their professional scope of practice (SANC).

There are no statistics to indicate how many nurses have a qualification in occupational health nursing to compare these results to (Michell, 2011). These results suggest that the OHNPs are not continuing their education and training in post-graduate occupational health nursing programmes. The reasons for this apparent lack of training are not known, however the following factors could play a role. The numbers of institutions offering tertiary education in occupational health nursing are too few, and are often not accessible to OHNPs. This is supported by Michell (2011) who says the lack of facilities available for tertiary education in occupational health is a gap that needs to be addressed. We do not know if OHNPs recognise the need for further studying and/or the reasons why they are unable to undergo training. In industry, it is often difficult for OHNPs to be away from the workplace to attend training as there is no-one to replace/locum for them, and organisations are loath for the nurses to be absent from work. Time constraints and workload also hamper OHNPs from studying as they often work alone. It is not known what continual professional development (CPD) and/or in-service training is being conducted for OHNPs, especially regards diabetes management; although SASOHN has an annual Conference and hold academic days every year, (<http://www.sasohn.co.za>). Furthermore, OHNPs will attend short courses that address specific needs for occupational health e.g. Spirometry and Audiometry. There are short courses available on diabetes management but it is not known how many OHNPs attend this training. There is no regulatory body that keeps track of training being provided to occupational health nurses nor whether occupational health nurses in are the field competent in their practice (Michell, 2011). There is no mechanism in place for keeping record of statistics relating to OHNPs in practice and their qualifications (Michell, 2011). It is not known how many institutions or courses that provide training on diabetes management nor how accessible these are for OHNPs. OHNPs are not improving their qualifications. Few OHNPs have studied for a Master's degree when there is a need for evidence-based research in occupational health nursing (DOH HRH Strategy, 2011).

One hundred and eighteen respondents provided information on which province they worked in, in RSA. Of the nine provinces, Western Cape had the highest number of OHNPs (36), followed by Gauteng with 31 OHNPs. The unique aspect of these two provinces is that they are industrial heartlands of RSA therefore are more in need of occupational health nurses. Northern Cape had only one OHNP and has limited industrialisation; therefore this reflects the industrial status of the province (see Table 4.2a). The inconsistencies in results e.g. the eight respondents that did not provide information on which provinces they worked in, influenced end results. The researcher could have enquired which SASOHN region the

respondents belonged to, to enable comparison and generalisation to the population of members on the database. It is not known what the distribution is of OHNPs in the respective provinces. At time of writing, no record was available from DOH or SANC on the numbers of nurses employed in each province nor where nurses are working in the respective provinces. All 126 respondents provided information on the organisations they worked in. There are various types of organisations in RSA. The organisations the OHNPs worked in were grouped together, according to their functions. The highest number of responses was for OHNPs working in Category 1 (see Table 4.2b). However, some respondents selected more than one type of organisation or did not indicate type of organisation they were employed in. There is no study to support the numbers of OHNPs working in different organisations/industries in RSA. Too few responses were received to enable significant comparison between types of organisations that the OHNPs worked in. The type of organisation will influence the nature of work performed and the risks that are present that the employees are exposed to (Acutt, 2011). This could impact on the need for screening for diabetic clients to ensure they are not working in high-risk jobs.

One hundred and sixteen (116) respondents) provided information on the hours worked per day and days worked per week by OHNPs. Ninety-two (92) worked 5-8 hours a day with the highest number in categories 2 and 4 and the lowest in categories 7 and 8, (see Table 4.2c). Of the 110 respondents that responded, 99 worked 5-7 days a week with the highest number in categories 1 and 2 and the lowest in category 7 (see Table 4.2c). In the researcher's experience, the greater the number of employees, the more hours a day and days are worked per week. An average shift is 9 hours per day and 5 days according to the Basic Conditions of Employment Act 75 of 1997 (Bezuidenhout et al., 2007). No relationship could be determined between numbers of hours worked per day or days per week versus the type of organisations that the OHNPs worked in as the data set was too small and the organisations were categorised for the purpose of this study. No correlation was drawn between the amount of hours worked per day and days per week and what diabetes management programme was in place. It is not known whether they are being remunerated for overtime and/or are working shifts nor how this would impact on their management of their clients in the OHCs.

Seventy-two (72) of the 124 respondents that responded were employed permanently in the organisations where they worked (see Table 4.2d). Similar results were obtained in the SASOHN Salary Survey in 2007 where 218 (69%) respondents were also employed permanently in the organisations where they worked (see Table 2.3a; SASOHN). Eleven (11) OHNPs were self-employed but respondents did not indicate whether they were employed through an agency or were self-employed. The majority of OHNPs in all the categories of

organisations were permanently employed except in category 6 (see chart 4.2c). The employment status of an OHNP could have an impact on the number of hours per day that the OHNP works depending on the type of contract with the relevant industries. This could impact on the time available on site and what services are provided by the OHNP as well as the extent to which diabetic clients are managed in the OHC. No correlation was drawn between the amount of hours worked per day and days per week and what diabetes management programme was in place.

### **5.3 Organisations, employees and clients with diabetes**

One hundred and fourteen (114) respondents reported they looked at staff in organisations that employed between 1 to 3000 workers. Only four (4) OHNPs indicated the organisations they worked in employed more than 3000 people who was in categories 2 and 3 (see Table 4.3a). As no study could be found on the numbers of OHNPs in different types of organisations and because organisations were categorised in this study, no further analysis could be done. No statistics were sourced on the number of employees that work in different types of organisations or the number of OHNPs per number of employees. The type of organisation and number of employees can impact on the OHNPs services and practice (Michell, 2011). No distinction was made between the numbers of employees and the numbers of days worked by the OHNPs.

One hundred and twelve (112) respondents provided information in relation to the average age of the employees within their organisations (see Table 4.3b). One (1) OHNP indicated the average age of employees was less than 25 years. Four (4) OHNPs reported the average age of employees was over 50 years which reflects the aging work population (ref). The age of an employee has an impact on the type of work performed and the risks an employee is exposed to also influence the state of the employees' health. There is a high incidence of employees (48) in the age group 36-40 years (see Table 4.3b). The older workforce raises concerns regarding the development of chronic illnesses as older people are more likely to develop chronic illnesses like diabetes. The age of the employee should be taken in to account when screening for diabetes.

One hundred and eighteen (118) respondents reported the number of diabetic clients they managed in their organisations (see Table 4.3c) and 99 reported the numbers of diabetic clients that visited the clinics monthly (see Table 4.3d). The researcher also did not source information on statistics regarding numbers of diabetics in the different types of organisations. It is not known how the number of diabetic clients influences the extent to which a diabetic programme is implemented within an organisation.

The results obtained indicated that most OHNPs (104) had between 1 to 50 diabetic clients, while 14 OHNPs reported having more than 50 diabetic clients with the highest number being in category 2 (see Table 4.3c). The highest number of diabetic clients was found in category 1 while the lowest was in category 8. As expected, OHNPs in organisations with the most diabetics, reported more diabetic clients visited the clinics. Some responses were inconsistent as they did not match the number of employees stated and could possibly have been totals of all the clients seen in the clinics and not just the diabetics. These higher numbers of clients seen in the clinics could also mean that diabetics were seen more than once a month. Furthermore, some respondents indicated that few clients were seen even though the total numbers of employees given were high (Table 4.3a; Table 4.3c; Table 4.3d).

The number of employees, the number of clients with diabetes and the number of diabetic clients seen per month, are different for each type of organisation (see Table 4.3a; Table 4.3c; Table 4.3d) as expected. The type and severity of risks at the respective organisations could result in more clients having to be routinely screened for diabetes, thereby increasing the number of clients diagnosed with diabetes. The researcher wanted to determine what percentage of the total employees were diabetic. However, as the numbers were given in ranges, specific percentages could not be calculated. More accurate information would have been obtained if the researcher had asked for the actual number of employees, diabetics, and clients seen per month; thereby enabling the researcher to determine the percentage of diabetics per total number of employees. Inconsistent responses were received from respondents that did not indicate how many employees and/or diabetics were working in their organisations.

An accurate figure of the actual numbers of diabetics was not obtained therefore no comparison could be made with the actual numbers of diabetics visiting the clinics on a monthly basis. What is not known is how many diabetic clients visit the OHCs versus diabetic clients that visit either the Local clinics/CHCs or private doctors. Also, the reasons why the diabetic clients visit the OHC are unknown. The diabetic clients might be attending for random glucose checks on odd occasions or might be attending every month for follow up which would increase the number of clients seen per month. The type of service and care provided by the OHNP could influence the number of diabetic clients that attend the OHC e.g. if no PHC services are provided and no chronic medication is dispensed, then diabetic clients will not come to the OHC, they would attend their own health care providers.

The number of diabetic clients can influence the extent to which a diabetic programme is implemented within an organisation, and determine whether diabetics are treated and managed on site or are referred. The factors that could influence the number of diabetics

diagnosed are the respondents' screening programmes and the type of work the employees are engaged in (necessitating clients being monitored for diabetes due to high risk jobs) (SASOM Guideline No 12). Therefore diabetics could be identified during wellness programmes, routine screening or during work assessments to determine fitness to perform certain jobs. Once a client is diagnosed with diabetes, they would then be monitored in the OHC and/or referred.

#### **5.4 OHNPs' knowledge of and screening for diabetes in the workplace**

Respondents rated their perception of their own knowledge on important aspects of diabetes (see Table 4.4a). Only 9 OHNPs rated themselves as having very good knowledge of diabetes management. The majority of OHNPs rated their perception of their own knowledge on diabetes management, blood glucose control, screening, monitoring, glucose testing and complications of diabetes as average to good. Further information was provided by respondents on their perception of their own knowledge on other aspects of diabetes. In relation to the prevalence of diabetes, nutrition, weight management, physical activity, use of medication, and foot and eye care, respondents also rated their own knowledge as average to good (see subsection 4.4.1). Few OHNPs rated their knowledge on these aspects of diabetes, as poor or very poor.

It appears that OHNPs consider their knowledge of the different aspects of diabetes to be average to good. A paucity of literature was available to support other OHNPs perceptions of the extent of their knowledge on diabetes and related aspects. There may have been other studies on nurses' perceptions of their own knowledge about diabetes from a PHC perspective. The researcher would have liked to compare respondents' perception of their knowledge with their actual knowledge because the OHNPs' knowledge of diabetes will be reflected in his/her practice; however this analysis was not done.

One hundred and fifteen (115) respondents were able to provide information on how many types of diabetes there are. Of the 115, 70 OHNPs indicated there are two types while 6 respondents gave the correct answer of four types of diabetes (ADA, 2009). Six (6) OHNPs were able to give the correct answer and the majority indicated there were only 2 types of diabetes.

All 126 respondents provided information on their knowledge of the predisposing factors for developing diabetes (see Table 4.4d). Most respondents indicated that a parent with diabetes, a BMI greater than or equal to 25kg/m<sup>2</sup>, physical inactivity, ethnicity with high risk of diabetes, and women employees with gestational diabetes were predisposing factors for developing diabetes (see section 2.6). This has implications for history taking, physical

examination and health education. Of concern is that only 68 (54%) OHNPs indicated that a history of cardiovascular disease was a predisposing factor for developing diabetes, (ADA, 2009). The number of OHNPs that answered 'No', 'Don't know', or did not respond at all raises concern about the OHNPs' knowledge base. Knowledge is linked to practice and the management of clients with diabetes. An OHNP cannot manage diabetic clients if he/she does not know what to look for and therefore how to manage it. If OHNPs do not know these criteria are predisposing factors for developing diabetes, they might not recognise them, nor treat, provide health education or refer clients.

One hundred and twenty-four (124) respondents provided information on whether IFG and IGT were regarded as pre-diabetic conditions (see Chart 4.4a). Eighty-seventy (87) OHNPs agreed that IFG and IGT were conditions for identifying pre-diabetic workers whereas 19 indicated that they did not know (ADA, 2009). The fact that only 87 of 124 OHNPs gave the correct answer is an issue/concern i.e. once again indication of lack of knowledge base of OHNPs. If the OHNP is not aware of or does not recognise these conditions as risk factors for clients being pre-diabetic, they will not identify or diagnose them on examination. This has implications for clients at risk not being identified nor interventions implemented to prevent the disease from developing.

Of 123 respondents that provided information, 104 agreed that IFG and IGT were risk factors for developing diabetes while 14 indicated they did not know (Chart 4.4a; ADA, 2009). Once again another issue of concern because if they didn't know how are they able to care for their clients. OHNPs will not be able to assist clients in preventing the development of diabetes nor initiate care for diabetics if they don't know the risk factors or predisposing factors.

The FBG is one of the diagnostic tests used in screening for diabetes. Out of 123 respondents that provided information, 109 OHNPs (90%) correctly indicated the term 'fasting' refers to "no caloric intake for at least 8 hours" (ADA, 2009). The 10% that provided the incorrect answer is an issue because incorrect instructions could be given to clients before the FBG being performed, resulting in inaccurate results and misdiagnosis. Of 121 respondents that provided information on the diagnostic test for IFG, the majority (65%) correctly indicated that FBG was the diagnostic test used to screen for IFG (Chart 4.4b; ADA, 2009). Seventy-one (71%) percent of 114 respondents that provided information, correctly selected the OGTT as the diagnostic test to screen for IGT (Chart 4.4b; ADA, 2009). Eight (8) respondents indicated other tests that were used within their organisations and listed the HbA1C and glucostix, however only HbA1C can be as a diagnostic test (ADA, 2009). This lack of knowledge about the tests used to diagnose IFG and IGT are again an area of concern. If the OHNPs do not know which diagnostic test to use, the results would not be

accurate. This has implications for the identification and diagnosis of clients with pre-diabetes and could result in clients not being managed correctly.

One hundred and twenty-two respondents provided information on whether both the FBG and the OGTT were used to screen for diabetes. Of these, 50% agreed that both the FBG and the OGTT were used to screen for diabetes while 19 respondents did not know (Chart 4.4c; ADA, 2009). Furthermore, 70 respondents (62%) out of a total of 113 agreed that both the FBG and the OGTT were used to diagnose diabetes and again 19 respondents did not know (Chart 4.4c; ADA, 2009). The time constraints related to this study resulted in no further analysis being done to compare the OHNPs' perception of their knowledge of screening to actual knowledge as indicated here. A gap is identified here in the knowledge base of OHNPs regarding the tests performed to screen for and diagnose diabetes, which has an implication for OHNPs' practice of screening. Whether the OHNPs are conducting the tests themselves or referring clients for screening, if the incorrect tests are used, clients are in danger of being misdiagnosed resulting in incorrect, or no, treatment being given. Either way, clients will not be followed up and managed with the result that the complications and consequences of diabetes will not be addressed and the client's health will be compromised.

A total of 119 respondents provided information on the range of measurements used to diagnose diabetes with the FGB test; whereas 102 respondents provided information on the range of measurements used to diagnose diabetes with the OGTT, (see Chart 4.4d). Ninety-four (94) respondents correctly indicated the FBG test result should be greater than or equal to 126mg/dl ( $\geq 7$ mmol/l) for a client to be deemed to have diabetes, (ADA, 2009). The range used for diagnosing that a client has diabetes using the OGTT diagnostic test was measured 2 hours after a bolus of glucose was given. Forty-eight 48 respondents indicated the OGTT measurement to be a plasma glucose level of 140-199 mg/dl (7.8-11.0 mmol/l), (ADA, 2009) which is incorrect. Only 37% of the respondents (38) provided the correct answer that the OGTT measurement should be a plasma glucose level greater than or equal to 200 mg/dl (greater than or equal to 11.1 mmol/l). The researcher is not aware of the underlying reasons why some OHNPs indicated the incorrect tests used for the respective conditions or why the other tests were used as indicated. It appears that the OHNPs lacked the knowledge of which tests to use to screen for IFG and IGT and which measurements to use to deem a client diabetic. Therefore clients whose diabetes has not been identified would be missed however would continue to work in high risk areas. This has implications for clients in safety-sensitive jobs that develop hypoglycaemia and/or hyperglycaemias in the course of their work causing health and safety risks at work for them and others.



## **5.5 OHNPs' practice of screening for diabetes in the workplace**

One hundred and twenty-two (122) respondents indicated they raise awareness of diabetes in their workplaces by means of different approaches (see Chart 4.5a). One hundred and thirteen (113) OHNPs (93%) engaged in one-on-one consultations, 81 (66%) provided health promotion/ education drives/campaigns and 81 (66%) used wellness interventions. There was a high non-response rate for health promotion/education drives/campaigns and for wellness interventions by OHNPs, which indicated that these approaches were not utilised and this is an issue for concern. The reasons why the remaining 44% of OHNPs do not implement these approaches is not known. Some of the constraints could be the time and costs related to organising and implementing these awareness initiatives. Clients are often not released from their places of work to attend health promotion drives and wellness interventions because of production demands. Therefore, one-to-one consultations are some of the easiest ways to provide health promotion to clients, when they visit the OHC for other services. Organising and implementing the awareness initiatives takes time and effort and means that the OHNP is drawn away from providing his/her normal services and this time often is made up after-hours. If outside educators and service providers are utilised, there could be costs involved and the OHNPs' time is again required for the co-ordination involved. Some OHNPs prefer face-to-face contact with their clients rather than initiatives where they are required to address groups of people, as they are not skilled in providing health education on a large scale but prefer the intimacy of personal contact. These 122 respondents did not indicate what media are used during these awareness initiatives. However, 19 respondents indicated they implemented other approaches to raise awareness of diabetes such as posters, pamphlets, emails, small group discussions and referrals. It is not known how the posters and pamphlets are utilised e.g. are they left in a central area for viewing and collection or discussed/distributed at consultations. The effectiveness of these approaches is not known as clients on the factory floor might not have access to emails. We also do not know how the referrals are co-ordinated nor to who clients are referred. If the OHNPs are not implementing diabetes awareness initiatives, i.e. not conducting health promotion to inform their employees about diabetes, then employees will remain ignorant of the disease and its negative consequences for both themselves and their families.

The lack of implementation of diabetes awareness initiatives is a concern as one of the most effective ways of creating awareness about diabetes is through awareness initiatives and campaigns. There is a dire need to raise awareness of diabetes to make employees aware of the disease and the risk factors for and/or complications of diabetes. Raising awareness of diabetes and convincing employees to change their lifestyles is an important part of primary prevention of the development of this disease. No study was available to determine/compare what health promotion is done by OHNPs to raise awareness of diabetes in the workplace

nor the approaches used. However information is available on health promotion in primary care settings.

During their diabetes awareness initiatives, 115 OHNPs (94%) provided information on weight control, 120 OHNPs (98%) provided information on lifestyle changes, 111 OHNPs (91%) provided information on risk factors and 108 OHNPs (89%) provided information on physical activity (see Chart 4.5b). A further 35 respondents indicated other types of information discussed during diabetes awareness initiatives.

Of the 126 respondents that provided information, only 64 (51%) routinely screened all their clients for diabetes (see Chart 4.5c). Thirteen (13) OHNPs performed this screening for the age group younger than 30 years and another 13 for the age group between 30-40 years of age. Only 5% of OHNPs indicated they screened clients between the ages of 41-44 years (<http://www.bd.com/>). It is not known how often these clients will be re-screened if the results are normal. A further 5% of OHNPs indicated they screened their clients after the age of 44 which is in line with the ADA position statement (ADA, 2009). Twenty-three (23) OHNPs selected more than one age group while nine respondents did not indicate at which age they screened for diabetes. Clients are often screened in a medical examination as a matter of routine, no matter what their age, which could account for respondents selecting more than one age group. Furthermore, 54 of the 64 respondents indicated they would re-screen their clients annually if results of the initial screening were normal (ADA, 2009). The information provided on clients that are screened is consistent with the reasons why clients are screened, not only for diabetes, in an occupational health setting. Workers at risk due to the type of work they are employed in are screened during routine medical examinations. Workers presenting with risk factors as described should be screened for diabetes.

The 62 respondents that indicated they do not routinely screen all their clients for diabetes, provided information on which clients they do screen (see subsection 4.5). These reasons included clients presenting with risk factors and/or signs and symptoms of diabetes; clients that were working in high risk areas e.g. drivers, clients working in cold storage areas and bakeries, and construction workers. Furthermore, permanent employees were screened annually as well as during pre-employment or periodical examinations. The concern raised here is why OHNPs do not screen all clients routinely for diabetes. A medical examination usually includes at least a urine test which would indicate glucosuria. If clients are not screened routinely or only certain clients are screened, the likelihood exists that clients with pre-diabetes or diabetes could be missed. Screening should preferably be done in the health care facility at the workplace for means of follow up of clients, rather than 'mass' screening' (ADA, 2009) therefore the OHC is an ideal place for these screenings to be conducted.

However, we do not know the practice and service-related constraints that the OHNPs face. Some OHCs do not provide PHC services therefore would not have the facilities to do screening. This means that clients that have pre-diabetes or diabetes but are asymptomatic, that are not screened are not being identified. Therefore these clients are not being treated or managed resulting in the complications relating to diabetes not being prevented. Furthermore, this leads to increased risks to the health and safety of not only the diabetic clients but fellow employees as well. There is also a risk of hyperglycaemia presenting in these clients with diabetes that have not yet been identified and clients could be misdiagnosed and incorrect treatment given, particularly in emergency situations.

Of the 113 respondents that responded, 45 OHNPs screened their clients with IFG or IGT for diabetes (ADA), and 34 of these 45 respondents did the screening annually. However, 35 respondents did not screen clients with IFG and IGT for diabetes and 33 respondents did not know if these clients were screened. OHNPs that did not screen their clients with IFG and IGT for diabetes as well as those OHNPs that did not know if these clients were screened are cause for concern. Those OHNPs that indicated they did not know if clients with IFG and IGT are screened or not, are either not aware of what screening is being done or because clients are not seen in the clinic for screening but are referred. It is another cause for concern that OHNPs do not know what tests are being performed on diabetic clients whether that client is seen at their local clinic or CHC or by their GP/medical aid. The OHNPs need to know what tests are being performed to ensure clients are being managed correctly. If the tests are not done, the OHNP should have a policy/standard/guideline on how to manage the client further. We do not know the environments within which the OHNPs work or the resources, or lack of them that are available to OHNPs.

In relation to the actual test used by respondents to screen for diabetes, 84 OHNPs correctly indicated they used the FBG test while 7 used the OGTT (see Table 4.6a; ADA, 2009). Although 28 respondents indicated they used other techniques to screen for diabetes, only 19 described what the other tests were, namely: *"HbA1C test, HGT, urine test, random blood glucose, a combination of tests and referral"* (see Table 4.6a). The HbA1C is the only other test that can be used to screen for diabetes (ADA). It is of concern that only 84 OHNPs knew which test to use to screen for diabetes.

If the OHNPs do not do screening themselves, they should be aware of what screening should be or is being done. This can be ascertained from local clinics or CHCs where clients are being seen, from GPs and private practitioners, from the OMP and from the client themselves. OHNPs should have a standard or guideline on which to base their practice on.

## **5.6 OHNPs' practice of diagnosis and follow up of clients with diabetes**

Of the 100 respondents that indicated which diagnostic test they used to diagnose diabetes, the majority (66) of the OHNPs indicated they used the FBG test, 14 OHNPs used the OGTT, and 20 OHNPs used other tests (see Table 4.6a). Of the other tests listed, only the HbA1C can be used to diagnose diabetes, the other tests are used just to monitor glucose.

On the diagnosis of diabetes in a client, there are five types of care that should immediately be performed (ADA, 2009). These five types of care are: a complete medical evaluation, an examination to detect complications, a review of treatment/glycaemic control, the formulation of a management plan, and the provision of a basis for continuing care (ADA, 2009). The respondents indicated which of these five types of care were applied on diabetes being diagnosed in their clients after clients had been screened (see Table 4.6b). The majority of the OHNPs (between 73 – 85%) indicated that each of the five aspects of immediate care was performed. However, the OHNPs that indicated they did not perform these five aspects of care, as well as the OHPs that indicated they did not know if the five aspects of care were performed, are cause for concern. To assess the health status of the clients that had been diagnosed with diabetes, a medical evaluation and evaluation to detect complications is essential. Treatment and the level of glycaemic control also should be determined so that a plan of action can be formulated to manage the client and provide a starting point for the continuity of care of the newly diagnosed diabetic. There would be no baseline from which to work to manage the client thereafter and any abnormalities that existed would not have been detected therefore would not be treated or managed thus compromising the health and well-being of the client. It is not known why these five aspects of care are not performed or why respondents do not know if they are done or not. Do the OHNPs need to confirm with the GP/medical aid and find out how clients are being treated, or did they not know these tests should be done, thereby showing a lack of knowledge on what care should be provided after a client is diagnosed with diabetes?

Respondents indicated what follow up tests were performed after clients had been diagnosed with diabetes (Table 4.6c; Chart 4.6a). Although 43 OHNPs did conduct a urine albumin excretion test, 44 OHNPs did not. Only 30 OHNPs conducted screening for distal symmetric polyneuropathy however 52 OHNPs did not. Similarly, 53 OHNPs did not perform a dilated and comprehensive eye examination and only 31 did. This gap in the practice of the OHNPs in performing necessary tests is an issue of concern. The reasons and constraints for why these tests are not performed are not known and should be investigated. Some of the constraints could be lack of time and resources to perform these tests as well as the costs of performing the tests. In which case the OHNPs should be referring the clients for this care to be given by other health care providers. Again, the results of these tests are used to assess

the clients' health status to form a basis from which to provide continuity of care thereafter as well as to implement interventions to address any abnormalities found.

Furthermore, the high non-response rate for the follow up tests performed, is also cause for concern as we do not know whether the OHNPs that did not respond do perform these tests or not. A further 14 respondents indicated that other tests were conducted on diagnosis of diabetes and provided information on what these tests were however these tests were not directly related to the specific types of care under discussion. If the OHNPs did not provide information, it could mean that they are also not conducting the required follow up tests. The reasons why these tests are not performed by the OHNPs needs further investigation as these gaps in the practice of following up clients with diabetes, must be addressed. If the tests cannot be done on-site, for example, due to cost and time constrains as is often the case, there should at least be resources and a process for referral.

### **5.7 Monitoring and supervision of clients with diabetes in the workplace**

Respondents were asked to indicate their actual practice on monitoring of risk factors, monitoring of glucose and follow up of mental health of diabetic clients. OHNPs use their knowledge to practice and the responses will indicate how OHNPs apply their knowledge to their practice. Monitoring refers to follow up and supervision of clients on a day-to-day basis to keep them healthy in order to continue working.

One hundred and nine (109) respondents provided information on the signs and symptoms used to identify hypoglycaemia (see Table 4.7a). Similar responses were grouped together and divided into autonomic symptoms, neurological symptoms, and neurological signs (Pudifin et al., 2008:149). Responses that did not match these were listed under 'Other' signs and symptoms. The highest responses for autonomic symptoms were sweating/clamminess (73) and dizziness/faintness (62) while the lowest response was for anxiety (18). The highest response for neurological symptoms was for confusion/delirium (42) and the lowest was inability to concentrate. The responses for the three neurological signs were 12 for unconscious, 7 for convulsions and 4 for depressed consciousness. As seen in Table 4.7a, the number of responses varied. The signs and symptoms are not listed in order of priority but each one is important in itself as any one, or combination thereof, can present in a client with hypoglycaemia.

Therefore, the fact that few responses were received from OHNPs for some of the signs and symptoms (see Table 4.7a) is an indication that they did not know them and therefor might not recognise them in clients presenting with hypoglycaemia. Additional information provided by OHNPs was divided into other signs and symptoms (subsection 4.7.1; Table 4.7a).

However, these signs and symptoms were not regarded as important nor listed (Soweto Trust, 2005:130; Pudifin et al., 2008:149) and should not be used to diagnose hypoglycaemia unless accompanied by more of the known signs and symptoms. No signs and symptoms were listed by 17 respondents which raise the question of whether they knew and would recognise them. The implication for practice is that the OHNPs might misdiagnose a client who is presenting with hypoglycaemia and therefore not treat the client accordingly.

One hundred and thirteen (113) respondents provided information on the treatment given to their conscious clients for hypoglycaemia. Forty-five (45) OHNPs incorrectly indicated the dosage of glucose to be given, as 10-15g of glucose, only 26 OHNPs correctly selected 15-20g of glucose and 19 OHNPs incorrectly selected 20-25g of glucose (ADA, 2009). The option of other treatment was selected by 19 OHNPs as discussed in section 4.7.1. Only 23% of the OHNPs administered the correct amount of glucose to their conscious clients to treat hypoglycaemia. The OHNPs that selected the other amounts of glucose is cause for concern as it indicates that the OHNPs lacked the knowledge of the correct treatment to administer. This could have implications for clients in that they would be administered too much glucose which could further influence their clients' glucose levels.

In response to which techniques respondents used to monitor effectiveness of glycaemic control in their diabetic clients, 86 OHNPs provided information on patient self-monitoring of blood glucose (SMBG), 64 OHNPs provided information on measurement of HbA1C and 56 OHNPs provided information on interstitial glucose test (see Chart 4.7a). Seventy-seven (77) respondents used SMBG, 45 respondents used HbA1C measurements and 35 respondents used an interstitial glucose test to monitor glycaemic control (ADA, 2009). Twenty-one (21) respondents provided additional information on techniques used to monitor glycaemic control as discussed in section 4.7.1 of the results. Of concern is the number of respondents that did not provide information on SMBG (40).

Furthermore, the number of respondents that did not provide information on measurement of HbA1C (62) and interstitial glucose test (70) were higher than the number of respondents that did provide information. All three techniques are useful for and can be used to monitor glucose levels (ADA, 2009). SMBG is the easiest technique to use and can be implemented by the client themselves to evaluate their individual response to therapy and assess their glycaemic control (ADA, 2009). SMBG gives the client control over managing his/her own glycaemic levels which is one of the aspects of self-management that clients should be encouraged to practice (ADA, 2009). Therefore, the researcher is concerned over the few OHNPs that implement this technique of SMBG in monitoring the effectiveness of glycaemic control. Glycaemic control is the most important factor to be considered in clients with

diabetes as lack of control over glucose levels can exacerbate the development of the complications of diabetes.

One hundred and twenty (120) respondents provided information on what the goal percentage was for the HbA1C test in their diabetic clients (see subsection 4.7.1). Forty-three (43) OHNPs indicated they did not know what this goal percentage was while only 36 OHNPs indicated a correct HbA1C result i.e. less than 7% (ADA, 2009). Forty-one (41) OHNPs indicated an incorrect answer. The number of OHNPs that did not provide information or indicated incorrect information is cause for concern. The implication for practice is that OHNPs might misdiagnose clients as having normal HbA1C test results and not treat clients accordingly.

Of 115 respondents that provided information on what percentage of their clients maintained good glycaemic control, only 62 OHNPs indicated the actual percentages (see subsection 4.7.1) of which only 28 OHNPs had 60% or more of their clients maintaining good glycaemic control. The clients that were not maintaining good glycaemic control would require more regular monitoring and follow up which would have implications for OHNPs' practice. It is not known whether OHNPs would monitor these clients themselves or refer them. The other 53 (46%) OHNPs did not know what percentage of their clients maintained good glycaemic control. This is an issue of concern as it is not known whether these OHNPs would monitor and follow up these clients to ensure glycaemic control was reached. However, we also do not know how many diabetic clients visit the OHC for monitoring and follow up versus those clients that visit the local clinics/CHCs or their own private health care providers.

One hundred and sixteen (116) respondents provided information on how often per year they tested HbA1C in diabetic clients with stable glycaemic control, while 115 respondents provided information on how often per year they tested HbA1C in diabetic clients not maintaining stable glycaemic control (see Chart 4.7b). Forty-nine (49) percent of the OHNPs never test the HbA1C in diabetics with stable glycaemic control while 28% of OHNPs test the HbA1C once a year. Only 10% of OHNPs test the HbA1C two (2) times per year, which is the same as recommended by the ADA position statement (ADA, 2009). In clients with unstable glycaemic control, 44% of OHNPs never tested the HbA1C, 12% of OHNPs tested the HbA1C once a year, and only 15% of OHNPs tested 3-4 times a year, as indicated by the ADA position statement (ADA, 2009). Of concern is that a large proportion of OHNPs are not conducting any testing of the HbA1c, whether for clients with stable or unstable glycaemic control.

The lack of testing could be related to the lack of knowledge of OHNPs of the testing required to ascertain glycaemic control in diabetic clients; or that the testing is not conducted at the OHCs. Reasons for why testing is not conducted could be related to cost, company policy, clients are referred, and/or whether clients are attending their own health care givers to have this test conducted. In practice, OHNPs will not have any indication of whether clients are maintaining good glycaemic control if the HbA1c is not tested at suggested intervals and will therefore not follow these clients up.

One hundred and eighteen (118) respondents provided information on what BMI OHNPs used to determine if an adult was overweight. Eighty-two (82) OHNPs reported a correct BMI of more than 25 kg/m<sup>2</sup>, (ADA). Therefore, in practice, 70% of OHNPs would be able to identify if clients were overweight and could then advise clients and implement interventions.

Of the 120 respondents that provided information on whether they monitored their diabetic clients for hypertension and dyslipidaemia (see subsection 4.7.2), only one (1) OHNP did not screen for hypertension. However, only 57 OHNPs (48%) indicated they monitored for dyslipidaemia in their diabetic clients. Forty-seven OHNPs provided reasons why they did not monitor for dyslipidaemia (see Table 4.7b) with the highest being referral and service-related reasons, and the lowest being lack of knowledge. The lack of monitoring for dyslipidaemia is cause for concern because of co-morbidity of cholesterolaemia and diabetes.

One hundred and eighteen respondents provided information on the measurements used to determine if a client is hypertensive using systolic measurement and 122 respondents provided information on the measurements used to determine if a client is hypertensive using the diastolic blood pressure measurement. Seventy (70) percent incorrectly indicated a systolic blood pressure of greater than 140mmHg instead of greater than 130mmHg while 86% incorrectly indicated a diastolic pressure of greater than 90mmHg instead of 80 mmHg.

One hundred and eighteen (n=118; 93.7%) respondents provided information in relation to how often fasting blood lipid profiles were measured in clients with diabetes. Of these 118, 65 OHNPs never measured lipid profiles followed by 45 OHNPs that indicated they measured fasting blood lipid profiles annually, which is consistent with the ADA position statement recommendations (ADA, 2009). Of the 45 respondents that measured fasting lipid profiles, only 10 OHNPs (19%) correctly accepted less than 100 mg/dl as the normal fasting level for LDL cholesterol, only 9 OHNPs (17%) accepted more than 40 mg/dl as the normal fasting level for HDL cholesterol in males, and only 12 OHNPs (23%) correctly accepted the measurement of more than 50 mg/dl for HDL cholesterol in females clients (Chart 4.7d; ADA, 2009). Nineteen (19) OHNPs (42%) correctly accepted measurement of less than 150 mg/dl



as the normal fasting level for triglycerides. The number of OHNPs that did not know the fasting blood lipid levels and the number of non-responses are a concern (see Chart 4.7d). If OHNPs do not know the correct levels for fasting blood lipids, they might not recognise abnormal fasting blood lipid results and therefore not treat or refer clients accordingly.

In response to which mental health aspects they followed up on in relation to diabetes, 97 respondents provided information on eating disorders, 95 provided information on psychosocial issues, 90 provided information on depression and anxiety, and 70 provided information on cognitive impairment (Table 4.7c; Chart 4.7e). Eighty-one (81) OHNPs followed up on eating disorders, 75 OHNPs followed up on psychosocial issues, 73 OHNPs followed up on depression and anxiety, and 41 OHNPs followed up on cognitive impairment. The OHPs that did not follow up on mental health status of their clients with diabetes is cause for concern. Diabetes has an emotional impact on clients and can lead to depression as well as having an impact on families of diabetics. Both client and families need support and counselling at times and the OHNP should be following up on mental health aspects.

### **5.8 Provision of continuity of care for clients with diabetes in the workplace**

One hundred and twenty-two (122) respondents indicated which health care facilities their clients with diabetes attended (see Chart 4.8a). Most of the OHNPs' clients attended a Local clinic/Community Health Centre, followed by a Private Practitioner. Only 15 (12%) OHNPs indicated clients with diabetes attended the Occupational Health Clinic/Centre. Furthermore, 23 OHNPs indicated their clients attended a combination of health care facilities. One hundred and twenty-two (122) respondents provided information on who was the main health care provider for clients with diabetes (see subsection 4.8.1). Most OHNPs (47%) reported that their diabetic clients received health care from a General Practitioner/Physician, while 36 OHNPs (29.5%) reported the OHNP/OMP to be the main provider of health care for diabetic clients. Twenty-nine (29) OHNPs (24%) reported the main health care givers were the Local clinic/Community Health Centre or a combination of health care givers.

Of the 122 respondents that provided information on where clients with diabetes obtained their medication, 53 OHNPs reported the Local clinic/Community Health Centre and 28 OHNPs reported a Private Practitioner (see Chart 4.8a). Only 9 OHNPs reported that the OHNP/OMP provided medication for clients with diabetes. A further 32 OHNPs reported that diabetic clients received medication from a combination of health care providers (Chart 4.8a; subsection 4.8.1). A smaller proportion of clients received their medication from the OHNP/OMP. This can be attributed to the OHCs not offering PHC; the fact that the OHNP and OMP should have a dispensing license in order to dispense medication; OHNPs refer their clients due to lack of resources and time constraints.

The low number of clients attending the OHC could be attributed to: how much care the OHC provides or whether clients are referred; clients with medical aid are also seen by their private doctors; some OHNPs do not provide PHC services; and OHNPs are limited in the care they can provide depending on the resources they have at hand. It is not known what care is provided at the OHC in comparison with the other health care facilities or whether the OHNPs work in tandem with the other facilities to provide continuity of care for the diabetic clients. A possibility exists for treatment and care to be duplicated or not done by either facility to the detriment of the clients. It is not known to what extent nor what type of care, the OHNPs provide for their diabetic clients.

In relation to which annual examinations were performed, 115 respondents provided information on a full medical examination, 89 respondents provided information on a comprehensive foot examination, 87 respondents provided information on a dilated and comprehensive eye examination, and 38 respondents provided information on examination for distal symmetric polyneuropathy (Table 4.8a; Chart 4.8b). The responses were as follows: 113 OHNPs performed a full medical examination on diabetic clients, 64 OHNPs performed a comprehensive foot examination, 44 OHNPs performed a dilated and comprehensive eye examination, and 38 OHNPs performed an examination for distal symmetric polyneuropathy. The low response rate is of concern, with the highest (43) being for examination for distal symmetric polyneuropathy; and raises the question whether the OHNPs are performing these examinations. It is not known if clients were referred to other health service providers for the examinations to be performed.

The annual examinations discussed here should be performed to assess the health status of and detect any complications in clients with diabetes in the workplace (ADA, 2009). The concern is that complications arising as a result of the diabetes are possibly not being identified early enough to implement interventions. Fifty-eight (58) respondents provided information on the reasons these annual examinations were not performed, (see Table 4.8b). The reasons were lack of resources (21), service-related (18), lack of knowledge/skills/training (15), clients were referred (12), and clients were on medical aid (8). Although only 46% of the respondents provided reasons why annual examinations were not performed, similar responses were obtained from the OHNPs, which indicate that they were experiencing similar constraints. The researcher raised the question of whether other OHNPs in practice also experience these constraints that prevent them from providing continuity of care to their diabetic clients.

Table 4.8c indicates the types of health professionals that the OHNPs utilised in their workplaces. The health professionals utilised most were the optometrist and the physician, while the health professionals utilised least were the sports scientist/personal trainer, podiatrist and ophthalmologist. Other health professionals utilised were the OMP, biokineticist, an EAP and wellness service provider, and social worker (see subsection 4.8.3). The large numbers of OHNPs that did not utilise or provide any information on the health professionals are cause for concern. However, it is not known why these services were not utilised, what the constraints were that prevented the use of these health professionals and/or whether the OHNPs referred diabetic clients for these services to be provided. The types of health professionals listed provide services to diabetic clients to ensure they receive comprehensive and specialist care to prevent the development of complications associated with diabetes (ADA, 2009). If specialised services are not provided, the continuity of care of diabetic clients will be compromised to the detriment of the clients and their families.

One hundred and twenty (120) respondents provided information in relation to the influenza vaccine (see subsection 4.8.4). Seventy-six (76) OHNPs (63%) confirmed that they offered the influenza vaccine to all clients with diabetes on an annual basis. Reasons offered by 38 OHNPs why an annual flu vaccine was not offered included: budget constraints, company decision, client decision, clients have medical aid, and service-related aspects. In practice, in the researcher's experience, budget constraints are one of the main reasons why certain services are not provided in an OHC. If the organisation is not convinced that a service is necessary, finances are not provided, particularly if employees are on a medical aid and can afford to pay. If the OHC does not provide PHC, there might not be facilities to manage medication such as influenza vaccines. It is up to the OHNP to suggest and motivate for services required. Influenza and pneumonia are common, preventable infectious diseases associated with a high mortality and morbidity particularly in the elderly and those with chronic diseases. Diabetics are more susceptible to contracting influenza therefore should be offered the vaccine annually (ADA, 2009).

Additional information was provided by 74 respondents on what percentage of their diabetic clients accepted the influenza vaccine (see subsection 4.8.4). Thirty-nine (39) OHNPs reported that between 0-30% of diabetic clients accepted the influenza vaccine, 19 OHNPs reported between 31-60% and 16 OHNPs reported more than 60% of diabetic clients accepted the influenza vaccine. A further 47 OHNPs listed the reasons diabetic clients did not accept the influenza vaccine, these being: costs, if clients have to purchase the vaccine themselves; client's lack of knowledge about the vaccine, causing fear and perception of the negative effect of the vaccine; and client's personal preference to take the vaccine or not. An

issue of concern is the low percentage of clients accepting the influenza vaccine. Education should be given about the vaccine, the reasons why it should be given, and the effect and side-effects; and client's fears of the vaccine should be allayed. This is an important aspect of the OHNP's role as an educator and health promoter. Influenza and pneumonia are common, preventable infectious diseases associated with a high mortality and morbidity particularly in the elderly and those with chronic diseases.

One hundred and twelve (112) respondents provided information on what percentage of their clients used an identification tool like a medic alert bracelet (see subsection 4.8.4). The majority of OHNPs (102) indicated that less than 25% of their diabetic clients used an identification tool (see section 4.8.4). The reasons 77 OHNPs gave on why diabetic clients did not use an identification tool included, amongst others: "financial constraints; OHNPs did not know and/or did not investigate or monitor; client's choice, in particular, *"don't want to use it as it marks that something is wrong"*; and work restrictions (like in a food industry or with moving machinery)". Diabetic clients should be encouraged to wear an identification tool for in case of emergency (to speak for them if they cannot, informing others of their condition).

## **5.9 OHNPs' management of diabetes in the workplace**

Objective 3 includes the management of diabetes which is a holistic approach to the care given to diabetics after monitoring and supervision. For this study, management includes continuity of care, namely, what care will be given until clients retire from their employment.

Of the 120 respondents that provided information on whether there is a diabetes management programme in place, 72 (60%) OHNPs indicated they did have a diabetes management programme in place. Out of the 48 respondents that indicated they did not have a diabetes management programme in place, 42 gave the main reasons why (see section 4.9.1). These reasons included: the type of service offered, clients are monitored and referred, and no PHC service was offered. Other reasons provided were: constraints, for example no time, workload and budget; client-related reasons for example few clients, clients seen once a year only or on one-to-one basis; clients are seen privately; and personal reasons, for example, *"haven't thought about it and lack of information, need to put in place and not implemented"*. The researcher wanted to draw a correlation between the numbers of diabetics in proportion to a programme in place. It stands to reason that the more diabetics an organisation has, the more beneficial it would be to have a diabetic management programme in place. On the other hand, the goals and focus of the OHC and the service being offered are often determined by the OHNP in liaison with the organisation in question. The OHNP can motivate for particular services based on a situation analysis and the needs of the employees being cared for. If the OHNP builds a relationship with the organisation's

management he/she can influence policy decisions in the favour of the clients to address gaps in the services provided or motivate for new services as needs arise. The issue of concern here is the possible lack of continuity of care being given to diabetic clients in the workplace if there is no diabetes management in place.

Sixty-seven (67) OHNPs provided information in response to the open-ended question of what aspects were included in their diabetes management programmes. Similar responses were grouped together for ease of presentation and analysis (see Table 4.9a). The highest responses were for the following aspects: health education/wellness (39), monitoring (37), glycaemic control (35) and diet control (34) whereas the lowest responses were for lifestyle modification (5) and illness treatment (3). These aspects are important areas for follow up needed by diabetic clients to ensure they receive continuity of care, however did not cover all the aspects of care necessary to manage diabetic clients comprehensively. Each of the OHNPs reported varied and unique combinations of responses depending on the type of service they provided, the needs of the clients present at their workplace, and the constraints they experienced in the care of diabetics. As the responses covered a very wide spectrum, only a brief analysis was done. A more in-depth analysis needs to be conducted of the aspects to be included in a diabetes management programme using the ADA position statement (ADA, 2009) as a guideline/reference.

Forty-four (44) OHNPs provided information in response to the open-ended question of what additional aspects they would like to include in their diabetes management programmes in the future, (see Table 4.9b). The highest response was from 35 OHNPs who indicated they would like to make use of specialist services such as *“dietician, specialist nurse, podiatrist, educators and specialist speakers, diabetic counsellor, ophthalmologist and optometrist as well as for HbA1C tests”*. The lowest response from 4 OHNPs was for educational aspects and 10 OHNPs provided other information. The researcher agrees that specialist services are required to identify and manage the complications that can arise from diabetes if glucose levels are not monitored and kept within normal limits. Although fewer responses were received for the other aspects listed as: special care, family/support, training for OHNPs, and service/constraints, these are still very important and should be considered when planning a diabetes management programme. More in-depth analysis of individual OHNPs' situations is required.

One hundred and twenty-one (121) respondents provided information on the use of a guideline for managing clients with diabetes (see Table 4.9c). The majority of OHNPs (81) did not have a guideline (see subsection 4.9.2). The researcher is concerned that only one third of the OHNPs are using a guideline to base their practice on. A guideline that provides

information/strategies on standards of care that should be provided to diabetic clients would be of use when an OHNP is developing a diabetes management programme for the workplace. The guideline would provide standards of practice that the OHNP could measure her programme against to identify gaps that should be implemented in the management of diabetes.

Of the 40 OHNPs that indicated they used a guideline for managing their clients, 34 provided details about the guidelines (see Table 4.9c). Ten (10) respondents indicated they used company guidelines, 17 respondents indicated they used guidelines from the Department of Health and 14 respondents used other guidelines. The Standard Treatment Guidelines and Essential Medicines List 2008 was used most by 15 OHNPs, followed by 8 OHNPs that used the Primary Clinical Care Manual (see Table 4.9c). Most of the guidelines used were PHC-based and were not specific to the occupational health setting except for the company policies and protocols.

Thirty-eight (38) respondents provided information on whether the guideline they used provided all the information needed to implement a diabetes management programme. Twenty-one (21) OHNPs agreed that the guideline they used provided all the information needed while 5 OHNPs were unsure. Of the 81 respondents that did not have a guideline, 40 OHNPs strongly agreed and 29 OHNPs agreed that a guideline, that provided instructions and interventions for the management of diabetes, would be useful in the workplace (see section 4.9.2). The majority of OHNPs appear to use guidelines that are PHC-based. Although these guidelines would provide valuable information and stipulate standards to be followed, they are not specific to the occupational health setting. Diabetic clients in the workplace require specific and unique care because of the risks they face in the working environment. It appears that 10 OHNP/OMPs have developed guidelines, standards, protocols, or programmes to manage their diabetic clients in their workplaces. OHNPs should use guideline/standards that are unique to occupational health to address different care given and taking into account the special needs of clients in the workplace.

Ninety-eight (98) OHNPs listed the aspects of care they considered most important for their clients with diabetes, in response to an open-ended question. Similar responses were grouped together and categorised into interventions (see Table 4.9d). Fifty-four (54) OHNPs listed diet as an important aspect of care and 45 OHNPs listed medication. The lowest responses were for hygiene (6) and benefits (3). All the aspects of care listed in Table 4.9d are important for the management of clients with diabetes. Each aspect should be implemented as an intervention in a diabetes management programme to ensure continuity of care for diabetic clients. The OHNPs all had different combinations of interventions listed

which would have been related to the type of services they rendered to clients and especially whether they offered PHC services to their clients. It would be useful to investigate how many of the interventions discussed by the OHNPs would also be considered important by other OHNPs and/or whether there would be other interventions that should be taken into account.

One hundred and eighteen (118) respondents expressed their personal views on eight statements that were made relating to their practice in managing diabetes (see Table 4.9e and Chart 4.9a). Forty-four (44) OHNPs agreed that the important decisions regarding daily diabetes care were made by the client with diabetes while 20 disagreed. Fifty-seven (57) of 119 OHNPs agreed that their health care professionals helped clients with diabetes to make informed choices about their care plans and only 6 disagreed. Out of 118 OHNPs, 75 agreed that the emotional effects of diabetes were considered significant while 13 disagreed. Sixty (60) of 117 OHNPs agreed that their clients with diabetes were well-informed about their condition while 24 disagreed.

Out of 118 OHNPs, 58 agreed that clients with diabetes had the right to decide how hard they would work to control their blood glucose but 27 disagreed. Fifty-six (56) of 114 OHNPs strongly agreed that the client with diabetes was considered the most important member of the diabetes care team and only 4 disagreed. Forty-seven (47) of 110 OHNPs disagreed that they found it frustrating to assist clients with diabetes to take care of their condition, and another 55 of 114 OHNPs disagreed to the statement: 'Your clients with diabetes are not supported by their family and friends'. OHNPs' views on which statements they agreed on differed, as expected depending on their personal attitudes to management of diabetes in their practice. These attitudes would influence their practice and how they manage their clients.

The OHNPs indicated which, of ten strategies, were being implemented in their diabetic management programmes (Table 4.9f; Chart 4.9b). The strategy most used by 70 OHNPs was that of delivering diabetes self-management education. The strategy of organising visits to multiple health care professionals on a single day, was the strategy least used by 9 OHNPs. The OHNPs' choice of strategies would determine which were implemented in their practice and give an indication of the aspects they include in their programmes. Further investigation is necessary to determine whether and how these strategies are implemented in practice.

The OHNPs reported on what barriers they experienced in the management of clients with diabetes (Table 4.9g; Chart 4.9c). The barrier that 95 OHNPs experienced the most was that

of lack of self-management on the part of the client. The barrier experienced the least by 26 OHNPs was that of a burden on their service. Each of the barriers listed in Table 4.9g would have an impact on the OHNPs' practice, although the extent of this impact would differ depending on the severity of the barrier. Each barrier experienced by the OHNPs when managing their clients with diabetes at their workplace, would be unique to their situation. Therefore, these barriers would require specific interventions to be implemented by the OHNPs to ensure continuity of care for their clients with diabetes. The conclusions and concerns determined from these findings will be discussed further with the recommendations.



## CHAPTER SIX: CONCLUSIONS AND RECOMMENDATIONS

### 6.1 Introduction

The chapter will deal with conclusions and recommendations and address how each objective has been achieved and the relationship of the findings to the conceptual framework. The chapter will also make some recommendations for new areas for further research. A crucial statement from chapter one is repeated here for ease of reference, i.e. *“The extent of the knowledge and practices of OHNPs in managing diabetes in the workplace in South African is not known. Therefore the contribution that OHNPs bring to the management of diabetes in the workplace needs to be explored.”*

### 6.2 Demographics

#### a. Gender and age – conclusions:

- The majority of the OHNPs were female which raised the concern that there was a lack of males in the occupational health field.
- The majority of OHNPs were above the age of 40 years. This dearth of future OHNPs and no younger generation to fill the gap when older nurses retire is a concern.

#### Gender and age – recommendations

- ✓ An investigation to be conducted into reasons why males are not entering the occupational health field.
- ✓ A strategy should be developed to encourage males to specialise in occupational health nursing.
- ✓ A vigorous marketing strategy to be promoted to inform career guidance teachers on how to attract new applicants to the nursing profession and to promote nursing as a career of choice.
- ✓ Marketing on the value of occupational nurses in the industry to be promoted in the chamber of commerce, nursing practice institutions, and nursing journals and at nursing conference proceedings.
- ✓ There is a need for a mechanism of transferring knowledge from skilled nurses to younger, newer nurses, possibly through coaching and mentorship as well as consultants.

**b. Occupational health nurse practitioners' qualifications – conclusions:**

- We do not know the reasons why OHNPs were not studying further or what other CPD courses and/or in-service training are being attended, especially related to diabetes management.
- There is no database of numbers of OHNPs that have occupational health qualifications and/or that are undergoing further training in occupational health nursing.
- The lack of training facilities and why nurses are not specialising in occupational health needs investigation.
- The accessibility to diabetes management training updates needs investigation.
- There is a lack of OHNPs completing Master's degrees.

**Occupational health nurse practitioners' qualifications – recommendations:**

- ✓ The number of nurses trained in occupational health nursing and practising as OHNPs should be determined to assess professional developmental needs.
- ✓ Further research needs to be done on the number and accessibility of tertiary institution for occupational health nursing training courses as well as for courses in diabetes management.
- ✓ Research needs to be conducted on reasons why nurses are not specialising in occupational health and not completing post-graduate training programmes to further their knowledge and skills and what the implications are for practice.
- ✓ To consult with the SANC to improve the data base of Occupational Health nurses.

**c. Province of practice and type of organisation employed – conclusions:**

- The province where most OHNPs were working was the Western Cape followed by Gauteng although some respondents did not indicate what province they worked in.
- It is not known what the distribution is of OHNPs in the respective provinces.
- The OHNPs worked in a variety of types of organisations with most working in category 1 organisations. Too few responses were received to enable significant comparison between types of organisations that the OHNPs worked in.

### **Province of practice and type of organisation employed – recommendations:**

- ✓ An investigation into the distribution of OHNPs through the provinces to determine where there is a need for occupational health nurses.
- ✓ Investigate the types of organisations OHNPs are working in to identify organisations that are not receiving occupational health care.

#### **d. Hours and days worked by OHNPs, and employment status – conclusions:**

- The majority of OHNPs worked an average shift of up to 8 hours per day although a small proportion worked between 9-12 hours per day.
- The majority of OHNPs also worked 5-7 days per week.
- No relationship was determined between numbers of hours worked per day or days per week versus the type of organisations that the OHNPs worked in.
- No correlation was drawn between the amount of hours worked per day and days per week, and what diabetes management programme was in place.
- In relation to employment status, 58% of the OHNPs were employed permanently in the organisations they worked in.
- No correlation was drawn between the amount of hours worked per day and days per week and what diabetes management programme was in place.

#### **Hours and days worked by OHNPs, and employment status – recommendations:**

- ✓ Conduct further research to determine the relationship between amount of hours worked per day and days per week and the relationship with diabetes management programmes.
- ✓ Further research could be done on the impact of employment status on the services that are provided in an OHC and the management of diabetic clients in the workplace.

### **6.3 Organisations, employees and clients with diabetes**

#### **a. Number of employees and clients with diabetes – conclusions:**

- The number of employees, the number of clients with diabetes and the number of diabetic clients seen per month, are different for each type of organisation.
- The exact number of diabetic clients per organisation is not known.

- An accurate figure of the actual numbers of diabetics was not obtained therefore no comparison could be made with the actual numbers of diabetics visiting the clinics on a monthly basis.
- The number of diabetics visiting the OHCs, the number of clients not seen at the OHC but that are referred, and the number of diabetic clients seen privately using medical aid, are not known and could all impact on the number of clients visiting the OHC on a monthly basis.
- The reasons why the diabetic clients visit the OHC are unknown nor how many diabetic clients visit the OHCs versus diabetic clients that visit either the Local clinics/CHCs or private doctors.

**Number of employees and clients with diabetes – recommendations:**

- ✓ Further research is required to determine the actual numbers of diabetics in the different types of organisations.
- ✓ Further research is required to determine to what extent these diabetic clients are being treated and managed on-site.
- ✓ Further research to determine the influence of numbers of employees and diabetic clients on a diabetic programme.

**b. Average age of employees – conclusions:**

- The majority of employees' ages were between 36-40 years and 14% of employees were older than 50.
- The age of the employee should be taken in to account when screening for diabetes.

**Average age of employees – recommendations:**

- ✓ A more detailed analysis of the older workforce and the number of diabetics diagnosed and the influence this has on diabetes management programmes could be done.
- ✓ An investigation into the age of employees and screening practices is needed.

## **6.4 First objective of the study**

The first objective of the study is: “To explore the extent of knowledge and practices of OHNPs regarding screening for diabetes in the work place”.

### **a. Knowledge on aspects of diabetes – conclusions:**

- It appears that OHNPs consider their knowledge of the different aspects of diabetes to be average to good.
- The lack of knowledge of the OHNPs regarding how many types of diabetes there are, is cause for concern.
- Although most respondents indicated that a parent with diabetes, a BMI greater than or equal to 25kg/m<sup>2</sup>, physical inactivity, ethnicity with high risk of diabetes, and women employees with gestational diabetes were predisposing factors for developing diabetes, the numbers of non-responses are cause for concern.
- Only 54% of OHNPs indicated that a history of cardiovascular disease was a predisposing factor for developing diabetes.
- OHNPs’ lack of knowledge on IFG and IGT as pre-diabetes conditions and risk factors for developing diabetes are cause for concern.

### **Knowledge on aspects of diabetes – recommendations:**

- ✓ Further research could be done to determine OHNPs’ actual amount of knowledge of the crucial aspects of diabetes and diabetes management.
- ✓ To address the knowledge gap regarding types of diabetes, predisposing factors for developing diabetes, and IFG and IGT as pre-diabetes conditions and risk factors for developing diabetes; by CPD, in-service training/updates and workshops on diabetes.

### **b. Knowledge of screening for diabetes – conclusions:**

- Although 90% of OHNPs correctly indicated the term ‘fasting’ refers to “no caloric intake for at least 8 hours”, the 10% that provided the incorrect answer is an issue because incorrect instructions could be given to clients before the FBG being performed, resulting in inaccurate results and misdiagnosis.
- It appears the OHNPs lacked knowledge of which tests to use to screen for IFG and IGT.

- A gap is identified here in the knowledge base of OHNPs regarding the tests performed to screen for and diagnose diabetes, which has an implication for OHNPs' practice of screening.
- Only 50% of OHNPs agreed that both the FBG and the OGTT were used to screen for diabetes.
- It appears the OHNPs lacked knowledge of which measurements to use to deem a client diabetic.

❖ The outcomes also support the diagram presented in Fig 1.1, i.e. the link between the knowledge of OHNPs regarding diabetes and knowledge of the first step of managing diabetes in the workplace, namely, screening.

**Knowledge of screening for diabetes – recommendations:**

- ✓ To address the knowledge gap regarding fasting, which tests to use to screen for IFG and IGT, which tests are performed to screen for and diagnose diabetes, and which measurements to use to deem a client diabetic; by CPD and workshops/updates.
- ✓ A standard/guideline could be used/developed to ensure that OHNPs have a reference to work from.
- ✓ Further training and education programmes are necessary on the tests used for screening and diagnosing of diabetes.

**c. Practice of screening for diabetes – conclusions:**

- The OHNPs use different approaches to conduct diabetes awareness initiatives to promote health amongst their employees.
- However, almost half of the OHNPs are not conducting health promotion to raise awareness of diabetes amongst their employees.
- It is noted that the majority of the OHNPs that responded, are providing information on weight control, lifestyle changes, risk factors and physical activity to raise awareness amongst their employees of these factors that are related to diabetes, during their diabetes awareness initiatives.
- Only 51% of OHNPs routinely screened their clients for diabetes which indicates a gap in OHNPs' practice of screening for diabetes as well as in their knowledge.
- The majority of the OHNPs indicated they would re-screen their clients annually if results of the initial screening were normal, as recommended.
- The concern raised is why 49% of OHNPs do not screen all clients routinely for diabetes.

- The OHNPs that do not routinely screen all their clients for diabetes, provided information on which clients they do screen.
- All OHNPs should screen clients with IFG and IGT for diabetes; on an annual basis. The reasons why the screening is not done are not known.
- It is cause for concern that OHNPs do not know what tests are being performed on diabetic clients whether that client is seen at their local clinic or CHC or by their GP/medical aid.
- In relation to the actual test used by respondents to screen for diabetes, it is of concern that only 84 OHNPs knew which test to use to screen for diabetes.

❖ The outcomes also support the diagram presented in Fig 1.1, i.e. the link between the knowledge and practices of OHNPs regarding the first step of managing diabetes in the workplace, namely, screening and raising awareness are evident in their practices.

#### **Practice of screening for diabetes – recommendations:**

- ✓ The use of diabetes awareness initiatives should be encouraged by SASOHN to motivate OHNPs to conduct health promotion to prevent the development of diabetes.
- ✓ OHNPs to be informed/reminded of the importance of raising awareness and promoting health amongst their clients.
- ✓ Further research could be conducted to explore the different approaches implemented by OHNPs to raise awareness of diabetes and to determine the most effective approach.
- ✓ Investigate the constraints that OHNPs are faced with when implementing health promotion in the workplace as well as determine the impact of such health promotion initiatives on the employees.
- ✓ OHNPs to be informed of the correct practice to follow when screening for diabetes. A guideline to be used for OHNPs to base their practice on.
- ✓ SASOHN to be approached to motivate for the screening of employees in the workplace.
- ✓ OHNPs should have a standard or guideline on which to base their practice on.
- ✓ OHNPs to be made aware of the standards and guidelines available for the screening of diabetics.
- ✓ Further research to be done on the advantages of screening and also why OHNPs are not screening.

- ✓ Further CPD and training to be conducted on updating OHNPs knowledge of the correct age at which clients should be screened, what screening should be done and how, to best manage their diabetic clients.
- ✓ Further research is needed on what tests OHNPs are using, who they are screening and why they are not screening clients.

**d. Procedures of how OHNPs diagnose diabetes in practice – conclusions:**

- The majority of the OHNPs indicated that the FBG was the diagnostic test they used to diagnose diabetes, which is the preferred test.
- The lack of knowledge of the OHNPs that used the OGTT or other tests is cause for concern.

❖ The outcomes also support the diagram presented in Fig 1.1, i.e. the link between the knowledge and practices of OHNPs regarding the second part of screening, namely, diagnosis of diabetes.

**Procedures of how OHNPs diagnose diabetes in practice – recommendations:**

- ✓ To address the knowledge gap regarding the preferred diagnostic test to be used to diagnose diabetes; by CPD, in-service training/updates and workshops on diabetes.

**e. Follow up of clients with diabetes – conclusions:**

- Between 73-85% of OHNPs indicated that each of the suggested five aspects of immediate care were performed after diagnosis. However, the OHNPs that indicated they did not perform these five aspects of care, as well as the OHPs that indicated they did not know if the five aspects of care were performed, are cause for concern.
- The low numbers of OHNPs that performed follow up tests after clients had been newly diagnosed with diabetes is cause for concern and indicates a gap in the practice of following up these clients. The reasons for the high non-response rate also need to be investigated.

❖ The outcomes also support the diagram presented in Fig 1.1, i.e. the link between the knowledge and practices of OHNPs regarding the second part of screening, namely, diagnosis of diabetes.



**Follow up of clients with diabetes – recommendations:**

- ✓ OHNPs should be informed about the immediate care that needs to be performed on diagnosis of diabetes to improve their knowledge base and to motivate them to change their practice to provide a solid basis for continuity of care and management of newly diagnosed clients.
- ✓ More CPD and ongoing education and training programmes are required regarding types of immediate care to be provided.
- ✓ OHNPs might require further training in how to perform the immediate care suggested.
- ✓ The reasons and constraints for why the follow up tests were not performed as well as for the non-responses should be investigated.

**CONCLUSIONS OUTLINED IN SECTION 6.4 SUPPORT THE STANCE THAT OBJECTIVE 1: “TO EXPLORE THE EXTENT OF KNOWLEDGE AND PRACTICES OF OHNPS REGARDING SCREENING FOR DIABETES IN THE WORK PLACE” HAS BEEN ACHIEVED.**

## 6.5 Second objective of the study

The second objective of the study is: “To describe knowledge and practices of OHNPs regarding monitoring of diabetes in the workplace”.

### a. Monitoring and supervision of glycaemic control – conclusions:

- The lack of knowledge about the important signs and symptoms of hypoglycaemia, the listing of other signs and symptoms and the lack of information provided by some OHNPs are issues of concern which raises questions about the knowledge base of the OHNPs in recognising the signs and symptoms of hypoglycaemia.
- Only 23% of the OHNPs administered the correct amount of glucose to their conscious clients to treat hypoglycaemia.
- The low responses received for use of SMBG, measurement of HbA1C and interstitial glucose test to monitor the effectiveness of glycaemic control in diabetic clients are an issue that should be addressed in particular the use of the SMBG technique.
- There were very few OHNPs that were knowledgeable about the goal percentage for HbA1C test. Less than 60% of clients were maintaining good glycaemic control which would require monitoring and follow up by OHNPs. Almost half of the OHNPs did not know what percentage of their clients maintained good glycaemic control.
- OHNPs are not monitoring HbA1C levels at recommended intervals, to ascertain clients' levels of glycaemic control. However, the reason why this monitoring is not conducted is not known.

❖ The outcomes also support the diagram presented in Fig 1.1, i.e. the link between knowledge and practices of OHNPs regarding the second step in management of diabetes, namely, monitoring to reduce complications of disease.

### Monitoring and supervision of glycaemic control – recommendations:

- ✓ Refresher/training courses should be attended by OHNPs to update their knowledge on the signs and symptoms of hypoglycaemia to enable them to diagnose and treat clients appropriately.
- ✓ Immediate updates to be conducted on correct treatment to be given to a conscious client, for hypoglycaemia.
- ✓ CPD and an update on the monitoring of glycaemic control should be organised and conducted to inform OHNPs of guidelines for implementation in their practice.

- ✓ A mechanism needs to be developed whereby OHNPs are notified of the training and the need for it. The process of how OHNPs will access this training and the logistics of conducting the training throughout all the regions of SASOHN would be an issue to be addressed.
- ✓ Training/updates should be conducted on monitoring for good glycaemic control in clients and use of HbA1C tests.
- ✓ Investigate what techniques OHNPs are using to monitor clients' glycaemic control.
- ✓ Investigate reasons why HbA1C tests are not being done.
- ✓ OHNPs to be provided with guidelines, on testing of HbA1C in clients with stable and unstable glycaemic control, for implementation in practice.

**b. Monitoring and supervision of risk factors – conclusions**

- Seventy (70) percent of OHNPs would be able to determine if an adult was overweight, using the BMI measurement. Of concern is that 30% of OHNPs either used incorrect BMI measurements or lacked knowledge of what BMI measurement is used to determine if a client is overweight.
- Most OHNPs monitored their diabetic clients for hypertension, however only 48% monitored their diabetic clients for dyslipidaemia.
- Only some OHNPs provided reasons why dyslipidaemia monitoring was not conducted in diabetic clients; this concern needs to be investigated further.
- Most OHNPs indicated a lack of knowledge of the correct systolic and diastolic measurements used to determine hypertension in a diabetic client.
- Only 17-23% of OHNPs indicated knowledge of the correct fasting blood lipid levels for LDL cholesterol, and HDL cholesterol in men and women; while 42% of OHNPs indicated knowledge of the correct fasting blood lipid level for triglycerides.
- Although OHNPs indicated that clients were followed up for the mental health aspects related to eating disorders, psychosocial issues, depression and anxiety, and cognitive impairment, the numbers of responses differed and the lack of response is of particular concern.

❖ The outcomes support the diagram presented in Fig 1.1, i.e. the link between the knowledge and practices of OHNPs regarding the second step in management of diabetes, namely, monitoring to reduce complications of diabetes.

**Monitoring and supervision of risk factors – recommendations:**

- ✓ Training/updates are required on use of BMI measurements to determine overweight clients, new measurements to confirm hypertension, and measurement of fasting blood lipid levels.
- ✓ Investigate the lack of monitoring of dyslipidaemia in diabetic clients.
- ✓ OHNPs to stay updated about changes in practice; this requires a mechanism unique to the occupational health setting.
- ✓ Investigate the OHNPs' practices of following up on mental health aspects in their diabetic clients.

**INFORMATION PROVIDED UNDER THIS SECTION 6.5 SUPPORTS THE ASSERTION THAT OBJECTIVE 2 OF THE STUDY: “TO DESCRIBE KNOWLEDGE AND PRACTICES OF OHNPS REGARDING MONITORING OF DIABETES IN THE WORKPLACE”, HAS BEEN ACHIEVED.**

## **6.6 Third objective of the study**

The third objective of the study is: “To examine the knowledge and practices of OHNPs in management of diabetes in the workplace”.

### **a. Provision of continuity of care for clients with diabetes in the workplace – conclusions:**

- Clients attend a variety of health care facilities and health care providers including a combination of different facilities/care givers and to obtain medication. The reasons why fewer clients visit the OHC are not known nor what type of care the OHNPs provide.
- A concern exists regarding the continuity of care provided by the OHNPs in relation to the other health care facilities and health care providers.
- The proportion of OHNPs that are performing annual examinations differs depending on the type of examination performed. Of concern is the number of OHNPs that are not performing these examinations.
- The reasons provided by the OHNPs to explain why annual examinations were not performed, indicated various constraints and issues of concern which require further investigation.
- Although some of the OHNPs indicated which specialist health professionals they utilised in their workplaces, a large proportion did not. The use of specialist health professionals at the workplace needs further investigation to ensure continuity of care for diabetic clients.
- Sixty-three (63) percent of OHNPs offered the influenza vaccine to their diabetic clients.
- OHNPs reported similar constraints and reasons preventing them from offering the influenza vaccine.
- The majority of OHNPs reported low percentages of clients accepting the influenza vaccine and provided reasons why. It appears that cost constraints and clients’ negative perceptions of the vaccine are the main reasons why clients do not accept the vaccine.
- The majority of OHNPs indicated that less than 25% of clients used an identification tool like a medic alert bracelet. It appears that both the OHNPs and the clients are negative about the need for and use of such a tool.

❖ The outcomes support the diagram presented in Fig 1.1, i.e. the link between the knowledge and practices of OHNPs regarding the third step in management of diabetes, namely, continuity of care.

**Provision of continuity of care for clients with diabetes in the workplace – recommendations:**

- ✓ The continuity of care being provided by OHNPs for diabetic clients' needs investigation to determine the extent of care provided as well as the constraints experienced by the OHNPs.
- ✓ Investigate why examinations are not being performed and the issues of concern and constraints.
- ✓ Investigate the necessity for specialist health services on-site and the constraints preventing these services being utilised.
- ✓ Encourage offering of vaccines to OHNPs and clients, and education of employers on advantage/uses of offering the vaccine.
- ✓ Investigate constraints/reasons preventing OHNPs offering the vaccine.
- ✓ Education should be given about the vaccine, the reasons why it should be given, and the effect and side-effects; and client's fears of the vaccine should be allayed.
- ✓ Education of OHNPs and clients regarding the need for an identification tool to identify client's condition in case of emergency.

**b. OHNPs' management of diabetes in the workplace – conclusions:**

- Sixty (60) percent of OHNPs had implemented a diabetes management programme in their workplace. The lack of a diabetes management programme is of concern.
- OHNPs listed similar reasons and constraints why no diabetes management programme was in place, which requires more investigation.
- Similar responses were obtained from the OHNPs of what aspects were included in their diabetes management programme. These programmes would differ from workplace to workplace depending on the services and extent of the programme provided.
- OHNPs provided similar responses for the additional aspects to be included in their diabetes management programmes in the future. There were varied responses for the different aspects depending on the unique situation found at each OHC and

organisation. More in-depth analysis of individual OHNPs' situations is required to determine what is best for that particular OHC.

- The researcher is concerned that only one third of the OHNPs are using a guideline to base their practice on.
- A variety of different guidelines were used. The majority of the guidelines were PHC - related and not one used a comprehensive guideline as suggested by the ADA.
- The majority of OHNPs agreed that the guideline they were basing their practice on, provided all the information needed to implement a diabetes management programme
- Half of the OHNPs that did not have a guideline, agreed that a guideline would be useful in the workplace to provide instructions and interventions for the management of diabetes.
- Similar responses were listed by OHNPs on the aspects of care and interventions they considered most important for their clients with diabetes depending on their unique situation.
- OHNPs' views on which statements of practice they agreed on differed, as expected, depending on their personal attitudes to management of diabetes in their practice. These attitudes would influence their practice and how they manage their clients.
- The OHNPs' choice of strategies would determine which were implemented in their practice and give an indication of the aspects they include in their programmes.
- Each barrier experienced by the OHNPs when managing their clients with diabetes at their workplace, would be unique to their situation. Therefore, these barriers would require specific interventions to be implemented by the OHNPs to ensure continuity of care for their clients with diabetes.

❖ The outcomes support the diagram presented in Fig 1.1, i.e. the link between the knowledge and practices of OHNPs regarding the third step in management of diabetes, namely, continuity of care.

### **OHNPs' management of diabetes in the workplace - recommendations:**

- ✓ Further research should be conducted to investigate whether diabetes management programmes are being implemented in the workplace or not and the reasons why.
- ✓ The reasons and constraints why no diabetes management programme was in place, requires more investigation.
- ✓ A more in-depth analysis needs to be conducted of the aspects to be included in a diabetes management programme using the ADA position statement (ADA, 2009) as a guideline/reference.
- ✓ The circumstances present in OHNPs' Individual situations should be assessed to determine what is best for that particular OHC.
- ✓ OHNPs should use guidelines/standards that are unique to occupational health to address different care given and taking into account the special needs of clients in the workplace.
- ✓ The use of a comprehensive guideline, as suggested by the ADA, could be explored.
- ✓ It would be useful to determine how those OHNPs that had guidelines, were monitoring and supervising diabetic clients and whether the continuity of care they were providing was better with the guidelines.
- ✓ It would be useful to investigate how many of the interventions discussed by the OHNPs would also be considered important by other OHNPs and/or whether there would be other interventions that should be taken into account.
- ✓ Further research to be conducted on the influence of OHNPs' personal attitudes to management of clients with diabetes, on their actual practice.
- ✓ Further investigation is necessary to determine whether and how these strategies are implemented in practice.
- ✓ Further research to be conducted on the barriers and constraints OHNPs experience in their management of diabetics in their workplace and the specific interventions that would have to be implemented to ensure continuity of care for their diabetics.

**BASED ON CONCLUSIONS PRESENTED IN SECTION 6.6, OBJECTIVE 3: "TO EXAMINE THE KNOWLEDGE AND PRACTICES OF OHNPS IN MANAGEMENT OF DIABETES IN THE WORKPLACE", HAS BEEN ACHIEVED.**



## **6.7 Synopsis and end of the study**

The objectives that were developed for this study were addressed throughout the study and were achieved as indicated by the evidence and discussions provided in the above subsections.

### **6.7.1 Commendations to policy-makers**

The commendations to policy-makers based on the outcomes of this study are:

- ❖ A mechanism is required for the OHNPs to influence policy decisions in the favour of the clients in the workplace to address gaps in the services provided and/or motivate for new services as needs arise.
  
- ❖ Ensuring that standards and guidelines for professional practice are upheld.
  
- ❖ Addressing the provision of PHC services at the workplace.

### **6.7.2 Implications for further research**

Based on the outcomes of the study, the researcher proposes the following areas for further research:

- Research on the effect of screening programmes in the occupational health setting to diagnose diabetics and the follow up care that is given.
- More research is required on how much monitoring and supervision is being done by OHNPs.
- Research on the development of a mechanism to enable OHNPs to access training/updates and short courses in diabetes management and to enable OHNPs to stay abreast of changes in practice pertaining to occupational health nursing.
- Research on development and implementation of a guideline, specific to the unique requirements of the OHNPs in industry, to manage diabetes in the workplace.
- Research on the professional development needs and requirements of OHNPs in industry particularly to address the gaps in knowledge as identified in this study.
- Research on the implementation of a comprehensive diabetes management programme that includes all the aspects discussed to ensure continuity of care for the clients at the workplace; to promote health and prevent illness.

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**APPENDIX A: LETTER TO SASOHN TO REQUEST PERMISSION TO USE THE  
SASOHN DATABASE**



Faculty of Health and Wellness Sciences

Telephone: (021) 9596093

Fax: (021) 9596015

Email: [PretoriusM@cput.ac.za](mailto:PretoriusM@cput.ac.za)

13 May 2011

To South African Society of Occupational Health Nurse Executive Committee,

Re: Letter of request to utilize SASOHN Member Database

I am currently working on my Master's research and busy compiling my research proposal. My topic is "Exploring knowledge and practices of Occupational Health Nurse Practitioners in the management of diabetes in South Africa".

For my study population, I would like to utilize the Occupational Health Nurse Practitioners that are members of SASOHN. I am planning to use questionnaires as my tool to collect data and would like to send these questionnaires electronically.

I therefore am requesting a letter of permission from SASOHN EXCO to utilize the database of SASOHN members for access to email addresses.

I will forward my research proposal to you as soon as it has been approved by our Research Committee.

Please provide me with this letter of permission if it is granted.

Please feel free to contact me if you have any further queries in this regard.

Yours sincerely

(Mrs) M. Pretorius  
Lecturer: Nursing Department  
CPUT – Bellville Campus.

## APPENDIX B: PERMISSION FROM SASOHN TO USE DATABASE



**SASOHN**  
SOUTH AFRICAN SOCIETY OF  
OCCUPATIONAL HEALTH  
NURSING PRACTITIONERS  
Registered Public Benefit Organisation (Reg no 930024476)

15 May 2011

Dear Margot

### **Re: REQUEST FOR ACCESS TO THE SASOHN DATABASE**

I have been asked to respond to your request for access to the SASOHN Database.

SASOHN can and will make the database available for research purposes under the following conditions;

- A copy of the research proposal acceptance by an ethics committee or equivalent must be submitted to the SASOHN Educational Representative.
- Written and signed confirmation that the database will not be used for personal gain or for advertising purposes must be submitted to the SASOHN Executive, and
- The research findings need to be made available to the SASOHN Executive within a realistic time frame as agreed between both parties. These findings must be presented in a format that can be used to disseminate information to SASOHN members. It is preferred that it is submitted for publication in the Occupational Health Southern Africa Journal.

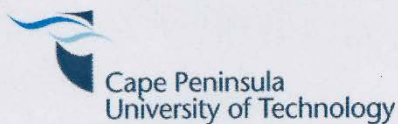
Please do not hesitate to contact me should you have any queries.

Regards  
Sonja Kruger  
SASOHN Educational Representative  
(Not signed as sent electronically)

**APPENDIX C: COPY OF THE QUESTIONNAIRE**

**(The questionnaire is attached as a supporting document)**

## APPENDIX D: COPY OF CPUT ETHICAL APPROVAL



14 September 2011  
CPUT/HW-REC 2011/H15

**P.O. Box 1906 • Bellville 7535 South Africa • Tel: +27 21 442 6162 • Fax +27 21 447 2963  
Symphony Road Bellville 7535**

**OFFICE OF THE CHAIRPERSON:  
HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE (HW-REC)**  
Registration Number NHREC: REC- 230408-014

At the meeting of the Health and Wellness Sciences-REC on 22 June 2011 approval was granted to Margot Pretorius pending amendments that have now been received and reviewed. This approval is for research activities related to an MTech: Nursing at this institution.

**TITLE:**

**Comprehensive management of type 2 diabetes by occupational health nurse practitioners in South Africa**

**INTERNAL SUPERVISOR: Dr P Basson**  
**EXTERNAL CO-SUPERVISOR: Dr M Lombard**

**Comment:**

Research activities are restricted to those detailed in the revised proposal and application submitted in August 2011

Approval will not extend beyond 14 September 2012. An extension must be applied for should data collection for this study continue beyond this date.

A handwritten signature in blue ink, appearing to read "Penelope Engel-Hills".

**Prof PENELOPE ENGEL-HILLS**  
CHAIR: HEALTH AND WELLNESS SCIENCES RESEARCH ETHICS COMMITTEE

e-mail: [engelhillsp@cput.ac.za](mailto:engelhillsp@cput.ac.za)

## **APPENDIX E: COVER LETTER FOR PARTICIPANTS**

### **EXPLORING KNOWLEDGE AND PRACTICES OF OCCUPATIONAL HEALTH NURSE PRACTITIONERS IN THE MANAGEMENT OF DIABETES IN SOUTH AFRICA.**

Participation in completing this questionnaire is voluntary and all completed questionnaires should be e-mailed to the principal researcher, Margot Pretorius, at [PretoriusM@cput.ac.za](mailto:PretoriusM@cput.ac.za). Please feel free to contact me if you have any further questions or require help in completing this questionnaire, by e-mailing your queries to Margot Pretorius at [PretoriusM@cput.ac.za](mailto:PretoriusM@cput.ac.za).

All information acquired through this questionnaire will be kept confidential at all times, and no participant will be identified at any time throughout this study or be made known to anyone else other than the researcher. This research is being conducted through the Bellville Campus of the Cape Peninsula University of Technology under supervision of Prof. Khalil, Mr Hassan, and Mrs Dunn.

As explained, you are under no obligation to participate in this study and can discontinue your participation at any given time, without victimization. The numbers printed in grey alongside the answer blocks are for office use only; in order to code your responses, therefore please ignore them when responding.

This study could have a direct impact both on your individual needs and on Occupational Health Nurse Practitioners (OHNPs) in general, in the future, therefore we value your participation.

The aim of this research is to determine whether OHNPs in South Africa are comprehensively managing diabetes in their respective workplaces.

The results of the study will be communicated to all SASOHN members via a report to be presented at the SASOHN monthly meetings.

Acknowledgement is given to the American Diabetic Association's Position Statement on "Standards of medical care in diabetes", which was used by myself to develop and compile this questionnaire.

When responding to the questionnaire, please read the instructions carefully before answering each question.

Thank you.

## APPENDIX F: COPY OF INFORMED CONSENT

### INFORMED CONSENT

#### Study Title

Exploring knowledge and practices of Occupational Health Nurse Practitioners in the management of diabetes in South Africa.

#### Background and Aim of the study

The researcher, Margot Pretorius, is an Occupational Health Nurse Practitioner and lecturer who is investigating the comprehensive management of diabetes by other professional nurses in an occupational health setting. This study will provide guidelines that will assist occupational health nurses in managing patients with diabetes in their workplaces, using a comprehensive approach.

#### Ethical Approval

This research has been approved by the Research and Research Ethics Committees of the Cape Peninsula University of Technology's Faculty of Health and Wellness Sciences. Furthermore, this study has been approved by the South African Society of Occupational Health Nurse Practitioners (SASOHN) executive committee, in the national office.

#### Personal Risks and Time Frames

There are no risks to your participation in this research – you will only be required to complete the enclosed questionnaire. According to the pilot study conducted, it should take approximately 30 minutes to complete this questionnaire.

#### Voluntary Participation

You are under no obligation to participate in this study as your participation is voluntary and no monetary gain will be forthcoming.

#### Privacy Protection

Your questionnaire will be allocated a unique reference number for the purpose of quality checks only. Therefore there will be no link between your personal details and the information submitted – in so doing your anonymity and confidentiality will be ensured.

#### Data Collection Process

All data for the study will be collected electronically by the researcher, who will also store the data electronically in a secure password-protected file. Should you not find time to submit the completed document by the required date, you will be reminded by the researcher to do so.

#### Contact Details

Should you require any further information, please do not hesitate to contact the researcher, Ms Margot Pretorius, at the following e-mail address: [PretoriusM@cput.ac.za](mailto:PretoriusM@cput.ac.za).

#### Feedback to Participants

A copy of the final research report will be communicated via the appropriate SASOHN structures for dissemination to all SASOHN members.

#### Confirming Participation

By virtue of the fact that you have submitted your consent form, either signed or unsigned, to me at [PretoriusM@cput.ac.za](mailto:PretoriusM@cput.ac.za), it will be accepted that you give your permission to be a participant in this study.

I, ..... (Print name) have read this consent form and voluntarily consent to participate in this study.

Subject's SANC Reference number: ..... SANC Receipt number for 2011: .....

.....  
Subject's Signature Date

I have explained this study to the above subject.

.....  
Researcher's Signature Date

## APPENDIX G: OBJECTIVES AND THEIR RELATIONSHIPS TO QUESTIONS

These tables list the objectives and the questions related to them.

<b>Section one</b>	<b>Information provided on</b>	<b>Question number</b>
Demographics	Industry	1.1
	Province	1.2
	Type of employment	1.3
	Hours of employment	1.4.1 and 1.4.2
	Gender	1.5
	Age	1.6
	Highest qualification	1.7
	Number of persons employed	1.8.1 only (Discard 1.8.1, 1.8.2)
	Average age of employees	1.9
	Number of diabetic clients	1.10 only
	Male versus female clients	1.11 (Discard)
Number of clients seen/month	1.12.3 only (Discard 1.12.1, 1.12..2)	
<b>Section two</b>	<b>Information on</b>	<b>Question number</b>
Awareness of diabetes: Respondents knowledge of diabetes as perceived by themselves	Prevalence in South Africa	2.1.1
	Diabetes management	2.1.2
	Nutrition	2.1.3
	Blood glucose control	2.1.4
	Screening	2.1.5
	Monitoring	2.1.6
	Weight management	2.1.7
	Physical activity	2.1.8
	Use of medication	2.1.9
	Glucose testing	2.1.10
	Complications of diabetes	2.1.11
	Foot and eye care	2.1.12

<b>Objective no 1</b>	<b>Perceived knowledge</b>	<b>Actual practice</b>
To explore the knowledge and practices of OHNP's regarding screening for diabetes (prevention; screening; diagnosis)	2.2 (disease)	2.3 (awareness)
	2.6 (risk factors)	2.4 (awareness)
		2.5.1-2.5.5 (awareness)
	2.7 (prevalence) (Discard)	3.5 (screening test)
	3.1 (disease process)	3.10 (screen)
	3.2 (disease)	3.11 (If No, which are screened)
		3.12 (If Yes, age screened)
	3.3 (screening test)	3.13 (screening)
	3.4 (screening test)	3.14 (screen for IGT/IFG)
	3.6 (screening criteria)	3.15 (follow up screen IGT/IFG)
	3.7 (screening criteria)	4.1 (diagnosis)
	3.8 just describe	4.3.1 – 4.3.6 (initial care post-diagnosis)
	3.9 just describe	4.4.1 – 4.4.4 (tests post-diagnosis)
4.2 (diagnosis test)		

<b>Objective No 2</b>	<b>Knowledge</b>	<b>Practices</b>
To describe the knowledge and practices of OHNP's regarding monitoring (and supervision) of diabetes in the workplace (monitoring; complication; follow up care)	6.10 (signs and symptoms)	5.1 (BMI)
		5.2 (monitor glucose)
		5.3 (glycaemic control) (Discard)
		5.4 (glycaemic control) (Discard)
		5.5 (monitor BP)
		5.5.1 (monitor BP)
		5.6 (monitor dyslipidaemia)
		5.6.1 (monitor dyslipidaemia)
		5.7 (risk; BP criteria)
		5.8 (risk; BP criteria)
		5.9 (monitor lipid profiles)
		5.10.1 – 5.10.4 (lipid level criteria)
		6.3.1 – 6.3.4 (monitor glucose)
		6.4 (monitor/follow up HbA1C)
6.5 (monitor/follow up HbA1C)		
		6.11 (complication – hypoglycaemia)

<b>Objective no 3</b>	<b>Knowledge</b>	<b>Practices</b>
To examine the knowledge and practices of OHNPs in managing (and continuity of care) diabetes in the workplace.		6.1 (facility used)
		6.2 (health care giver)
		6.6.1 – 6.6.5 (monitor; annual tests)
		6.7 (screens not done)
		6.7 (screens not done)
		6.8.1 – 6.8.5 (follow up)
		6.9 (dispenser of medication)
		6.12 and 6.12.1 (flu vaccine)
		6.13 and 6.13.1 (flu vaccine)
		6.14.1; 6.14.3 (continuity of care)
		6.14.5 – 6.14.11 (continuity of care)
		6.15 and
		6.15.1 (ID tool)
		6.16, 6.16.1 and 6.16.2 (programme)
		6.17 (programme)
		6.18 (years of experience) (Discard)
		6.19.1 – 6.19.8 (barriers)
		6.20.1 – 6.20.11 (strategies)
		6.21 (guideline used)
		6.22.1 – 6.22.4 (guideline details)
6.23 (guideline useful)		
6.24 (critical interventions)		
6.25.1 – 6.25.8 (personal views)		