

# CHAPTER 1

## Overview of the study

### 1.1 INTRODUCTION

Diabetes mellitus is one of the major chronic diseases which affect millions of people world wide. It is a metabolic disorder characterised by glucose intolerance. This systemic disease is caused by an imbalance between insulin supply and insulin demand. It is one of the serious, complex chronic diseases, which tend to accelerate degenerative changes throughout the body by widespread vascular changes in the large blood vessels and the micro-vessels if not treated properly. It affects mostly adults from the age of 25 years to 74 years, although it also affects children as young as 3 years old. Two types of diabetes mellitus are identified, type I and type II. About 5-10% of people with diabetes have type I and 90-95% have type II (Smeltzer & Bare 1992:1022).

Type I diabetes is known as Insulin Dependent Diabetes Mellitus (IDDM). The pancreas produces an inadequate amount of insulin. Individuals with IDDM are expected to follow a complicated regimen in order to manage their diabetes, with the assumption that such behaviour will reduce their risk of developing disabling and potentially fatal complications (Coates 1994:263). Type II diabetes, also known as Non Insulin Dependent Diabetes Mellitus (NIDDM) results from an increase in the sensitivity of the cells to insulin and a decrease in the amount of insulin produced. The onset of type I diabetes is usually before the age of 30 years, whereas type II occurs most frequently in people who are over 30 years of age and obese, and therefore affects people during later years.

Diabetes is characterised by an elevation in the level of glucose in the blood. The increase in the glucose level may be due to a decrease or absence of insulin production in the pancreas, which controls the blood glucose level by regulating the production and storage of glucose. This leads to abnormalities in the metabolism of carbohydrates, proteins and fats. The resulting hyperglycaemia may lead to acute metabolic complications such as diabetic keto acidosis, and long-term hyperglycaemia may contribute to chronic cardiovascular complications (kidney and eye disease) and neuropathic complications. Diabetes is also associated with an increased occurrence of macro vascular diseases including myocardial infarction and strokes (Smeltzer & Bare 1992:1022).

The outcome of diabetes mellitus depends almost entirely on the patient's self-management. Health professionals have a major responsibility in assisting patients to gain the necessary knowledge, skills and attitudes for self-management (Phipps, Long & Woods 1987:601).

Diabetes mellitus currently affects an estimated 11 million people in the United States. About 500 000 new cases of diabetes are diagnosed annually. It is prevalent in the elderly, though studies indicate that even children are affected. Diabetes is a leading cause of new blindness among 25-74 year olds in the United States and the third leading cause of death, mostly because of the high rate of coronary artery diseases which are a complication of diabetes mellitus (Smeltzer & Bare 1992:1023). The incidence of diabetes mellitus in South Africa for children is 0.07-3.5 per 10 000 population (Smeltzer & Bare 1992:1022). It was estimated in 1996 that 0.5 million people suffered from diabetes mellitus in South Africa (Working Group of the National Diabetes Advisory Board 1997:499).

The aim of the treatment of diabetes mellitus is to achieve blood glucose levels as close to the non-diabetic state as feasible. Patients must take responsibility for their own care and should therefore acquire the knowledge and technical skills to monitor urine and blood glucose, recognise and prevent hypo/hyperglycaemia and complications (Matwa, Chabeli, Muller & Levitt 2003:12).

The control of diabetes mellitus can be better maintained if patients adhere to a prescribed treatment regimen (Lewis & Collier 1992:1304). According to Coates (1994:264), patients may monitor their blood glucose levels by testing the urine or blood, though recently blood testing is preferred to urine testing because the latter is known to be inaccurate and may not warn the diabetic of impending hypoglycaemia. Patients can monitor themselves at home using reagent strips or a glucose meter. Monitoring of glucose at home enables patients to check the glucose level regularly and to use the results to decide on the management of their diabetes complications. Complications become a reality when treatment is not adhered to and this can be due to lack of knowledge. According to Hamera (1992:64) research results of studies done on diabetes mellitus reveal only the positive aspects of the disease, e.g., a positive attitude about having diabetes, and ignore the negative aspects. The experience is therefore not representative. For a sample to be representative, both positive and negative aspects should be included.

## **1.2 BACKGROUND OF THE PROBLEM**

Diabetes mellitus can be controlled through the correct treatment and adherence to the treatment programme. Failure to adhere to the treatment programme may lead to diabetic complications. As much as 80% of diabetic patients develop acute and long-term complications. Acute complications include polyuria, polydipsia, hypoglycaemia and keto acidosis. Long-term complications include diabetic retinopathy,

neuropathy and skin disorders, macro and micro angiopathy and peripheral vascular disease (Lewis & Collier 1992:1304; Sakamoto, Alberti & Hotta 1995:9). Matwa et al (2003:12) report several studies which showed that the incidence of lower limb amputations in diabetics could be reduced when a foot care teaching programme for diabetics was offered.

The occurrence of the complications mentioned above may be attributed to poor adherence to the regimen (programme), as it is indicated that glucose control delays the atherosclerotic process. Complications may be avoided or delayed through maintenance of a blood glucose concentration of between 4 and 12 mmol/L which can be achieved by adhering to a diet consisting of a balance of carbohydrates, proteins and fats, including insulin therapy and oral anti-diabetic drugs. If risk factors that aggravate macro and micro-angiopathy are diminished, the above-mentioned complications may be prevented (Cleaver & Pallourios 1994:175; Lewis & Collier 1992:1304). According to Huddle and Kalk (2000:7) there is sufficient evidence that long-term normoglycaemia and effective health education prevent, delay or attenuate the complications of diabetes mellitus.

Mason (1985) found in his study that the subjects were confused about the nature of their condition and lacked essential information pertaining to the management of their disease (Cleaver & Pallourios 1994:176). Keller (1998) maintains that the diabetic patient's adjustment to the disorder depends largely on family support, and that some negative patterns of interaction within the family affect the adherence to the diabetic regimen, and can lead to lack of control and even to attacks of keto-acidosis, for example, alcoholism in the family. If the patient is an alcoholic or family members are alcoholics, there is a possibility that the patient may not adhere to the diabetic regimen, as there may be no one among the family members to support him or her. There may be no one to remind the patient about his/her medication which should be taken before meals, or to encourage the patient to eat after taking medication, since they might be drunk. They might not even have prepared any food. All this might lead to uncontrolled blood glucose (Cleaver & Pallourios 1994:176). A study by Anderson, Donnelly and Dedrick (1990:242-243) reported misconceptions among patients about diabetes. Those patients who were on tablets or on a controlled diet, believed that their disease was less serious because they did not have to take insulin injections.

The diabetic patient may fail to take the treatment because of the side effects of diabetic medication. These side effects may even lead to marital problems. Examples of the side effects of anti-diabetic drugs include:

- allergic reactions
- nausea and vomiting
- diarrhoea
- sexual dysfunction

- haemoglobin disorders
- lipodystrophy

According to Andrews and Boyle (1995:239) and Royle and Walsh (1992:592), many people may suffer from diabetes mellitus in the future. It is of the utmost importance that health professionals identify the patients' knowledge about the disease in order to provide them with specific health education.

Apart from Andrews and Boyle (1995:239) and Royle and Walsh (1992:592), there are records which are kept in the Outpatient Department at Nkhensani Hospital which support the increase in the number of diabetic patients over the past few years because each year the number of newly diagnosed diabetic patients is increased by 20 (Hospital Register 1997).

Health care professionals have an obligation to explain to diabetic patients alternative treatment which can help to alleviate some of the side-effects. For example, reducing the dosage of the drug can alleviate the side-effects, more especially sexual dysfunction (Andrews & Boyle 1995:239).

### **1.3 PROBLEM STATEMENT**

It is evident from the literature that the incidence of diabetes mellitus is increasing and that although there is evidence that the complications of diabetes can be prevented, there are still patients who lack the required knowledge and skills to manage and control their condition. It is generally accepted that diabetics must take responsibility for their own care and treatment. Patients therefore have to acquire the relevant knowledge, skills and attitudes for successful diabetes management. This implies adequate diabetes education of patients as well as family members as a support group (Diabetes Education 2001:4). This study is an attempt to determine patients' and family members' knowledge and views on diabetes mellitus, to make recommendations towards improved diabetic education which might lead to improved adherence to the diabetic treatment regimen.

### **1.4 ASSUMPTIONS**

Assumptions are statements that are taken for granted or are considered to be true, even though these statements have not been scientifically tested (Burns & Grove 1993: 45). The following assumptions have been formulated:

- Diabetic patients and their family members are not well informed and knowledgeable about diabetes mellitus and its treatment.

- Lack of knowledge about diabetic mellitus may affect the patients' adherence to the treatment regimen.
- A diabetic patient's adjustment to the disorder depends largely on family support.

## **1.5 PURPOSE OF THE STUDY**

The purpose of the study is to determine the knowledge and views of patients and their family members about diabetes mellitus and its treatment regimen.

The researcher is interested in finding what could be the causes of non-compliance with the treatment regimen. Once the causes have been identified, recommendations can be made which might improve adherence to the diabetes treatment regimen.

## **1.6 RESEARCH OBJECTIVES**

The following research objectives were formulated to guide the researcher:

- to identify the patients' and family members' knowledge of diabetes mellitus and its treatment
- to identify the views of patients and their family members regarding diabetes mellitus and its treatment

## **1.7 SIGNIFICANCE OF THE STUDY**

This study can be of significance in providing information regarding the knowledge of diabetic patients and their family members on diabetes mellitus and its treatment, and also in identifying their views on the disease and its treatment. Once the patients' and family members' knowledge about diabetes mellitus and its treatment has been determined, health care providers will know what type of information to give diabetic patients and their family members. It will assist them to cultivate a positive view of the disease and its treatment, particularly those members with a negative view.

Furthermore, health personnel will understand the uniqueness of individuals through the data that will have been gathered. This will help them to accept the patients as they are. Patients and their family members may realise the importance of adhering to the prescribed treatment regimen, and start adhering to it. Complications may then be prevented. Patients and their family members will be kept informed concerning the disease by the health personnel. Patients will thus benefit and nursing care can be improved (Lewis & Collier 1992:1282).

## 1.8 DEFINITION OF KEY CONCEPTS

### Diabetes Mellitus

Diabetes mellitus is a disease characterised by a chronic elevation in the level of glucose in the blood. The normal range for blood glucose is 3.5-7.0 mmol/L. (Smeltzer & Bare 1992:1027). Black and Matassarini-Jacobs (1993:1775) define diabetes mellitus as a metabolic disorder characterised by glucose intolerance, a systemic disease caused by an imbalance between insulin supply and insulin demand.

Operational definition: For the purpose of this study it will mean type II diabetes mellitus with a blood sugar level of 10mmol/L and above and the diabetes mellitus patient must be on oral /injection (insulin) treatment.

### Complication

A complication refers to a confused condition or state, which complicates circumstances. According to Thompson (1995:272), it is a disease or condition aggravating or arising out of a previous one. For the purpose of this study a complication is accepted as an accidental condition or second disease occurring in the course of a primary process (*Blakiston's Gould Medical Dictionary* 1972:343).

### Keto-acidosis

It is a condition where excessive ketone bodies are produced by the liver and those ketone bodies accumulate in the urine (Black & Matassarini-Jacobs 1993:1793). Diabetic keto-acidosis is caused by an absence of or inadequate amount of insulin which results in disorders in the metabolism of carbohydrate, protein and fat. This leads to the clinical manifestations of dehydration, electrolyte loss and acidosis (Smeltzer & Bare 1992:1050).

### Glucose control

It means avoiding hypoglycaemia i.e. elevated blood glucose (Mollentze 2000:865).

### Hypoglycaemia

Hypoglycaemia is a reduction below normal in the blood glucose level. It is an abnormally low blood glucose concentration characterised by sweating, hunger, faintness, confusion and coma (Smeltzer & Bare 1992:1025). For the purpose of this study hypoglycaemia is a clinical state associated with decreased

blood glucose below the critical level for an individual, characterised by hunger, nervousness, profuse sweating, faintness, and sometimes convulsions (*Blakiston's Gould Medical Dictionary* 1972:736).

### **Side-effects**

They are secondary (usually undesirable or unwanted) effects of medicines. These effects occur following the administration of drugs (Thompson 1995:1289).

### **Family member**

A family member is a person belonging to a team or group as a result of relationship, whether the person lives with the group or not (Thompson 1995:487, 850).

Operational definition: For the purpose of this study, family members include those that are staying with the patient at home such as a spouse, children aged 16 years and older, and the in-laws.

### **Support system**

It is an organised group of individuals giving strength or encouragement to patients (Thompson 1995:1401, 1415).

Operational definition: For the purpose of this study a support system will include those who are related to the diabetic patient either by blood, marriage or adoption.

### **Treatment**

It is a mode of dealing with a patient or diseases in which specific medical or surgical treatment is undertaken (Weller 1997:415).

### **Treatment regimen**

It is a manner of behaving towards the prescribed course of exercise, way of life and diet (Thompson 1995:1156, 1486).

## Knowledge

Knowledge is awareness or familiarity gained by experience of a thing (Thompson 1995:753). In this case it is awareness or familiarity gained by experience of diabetes mellitus and its treatment.

## View

It is a manner of considering a subject, opinion, mental attitude (*Concise Oxford Dictionary* 1961:1428).

## 1.9 RESEARCH METHODOLOGY

### 1.9.1 Research design

A quantitative, descriptive survey design was used. In a quantitative approach, formal instruments are used to collect information. The whole is broken into parts so as to examine the parts. In this study only the knowledge of patients and family members of diabetes mellitus was examined (Burns & Grove 1993:28; Polit & Hungler 1993: 19).

The purpose of descriptive studies is to observe and describe aspects of a situation as it naturally occurs. A descriptive survey provides an accurate portrayal or account of characteristics of a particular individual, situation or group. Information that can be reliably obtained by asking an individual is suitable for inclusion in a survey. Surveys often focus on what people do, for example, how they take care of their health needs, their compliance in taking medication or behaviours they engage in. In this study data was collected on the knowledge and views of patients and family members with regard to diabetes mellitus and its treatment (Burns & Grove 1993:29; Polit & Hungler 1995:195, 196, 200).

### 1.9.2 Population and sample

The study population consisted of all the diabetic patients and their family members in the Mopani District that falls under the Lowveld region in the Limpopo Province.

A sample is a subset of a population selected to participate in a research study (Polit & Hungler 1993:445). In this study the sample will be named subjects. Polit and Hungler (1993:447) describe a subject as a person who participates in and provides data for a study. The subjects were diabetic patients re-admitted to the hospital due to their condition, i.e., the disease, and being from the Mopani District. It also included diabetic patients who visited the Giyani Health Centre. Family members who were included in the study

were those who stayed with the patients and included the spouse, parents, older children and in-laws. Hospital records were used to trace those in the community, as they provide residential addresses. A convenient sample of 64 subjects was chosen from the Giyani Health Centre and Nkhensani Hospital using snowball or network sampling. Convenient sampling was chosen because the phenomena under investigation are homogeneous and therefore the risk of bias is minimal. A convenient sample is the most readily available persons as subjects in a study (Polit & Hungler 1995:281, 282). The sample consisted of 32 diabetic patients and 32 family members living with diabetic patients.

### **1.9.3 Method of data collection**

Data was collected by using self-report questionnaires to evaluate the subjects' knowledge of diabetes mellitus and its treatment regimen. The researcher personally delivered two questionnaires, one to diabetic patients and the other to family members of patients. Questionnaires were chosen because they ensure a high response rate and offer the possibility of complete anonymity, which may be crucial in obtaining information about socially unacceptable behaviour. Questionnaires require less time and energy to administer. There is less opportunity for bias, as they are presented in a consistent manner and questionnaires can be distributed to a very large sample either directly or through the mail (Burns & Grove 1993:368; Polit & Hungler 1993:205).

Questionnaires were in both English and Xitsonga to enable those who did not understand English to answer in Xitsonga. Those subjects who could not read were assisted by the researcher who read the questions to them and then indicated their answers on the questionnaires. The researcher remained with the subjects while they were completing the questionnaires to explain questions that were not clear. Data analysis was done by a computer software program called SPSS (Statistical Package for Social Sciences). For the closed-ended questions descriptive statistics were used. The data of the few open-ended questions were analysed by the researcher through content analysis.

### **1.9.4 Measures to ensure validity and reliability**

In order to ensure the reliability and validity of this study, data triangulation was done through distribution of questionnaires to two groups including diabetic patients and their family members. Data triangulation is the use of multiple data sources in a study. Validity of the study was ensured by including a variety of questions on knowledge that patients and their family members should have about diabetes mellitus and its treatment (Polit & Hungler 1993:250). Questions on various aspects of diabetes mellitus based on an extensive review of literature were included to ensure content validity. Reliability was ensured by consistency in

administering questionnaires. All questionnaires were distributed personally by the research to the subjects and no single questionnaire was mailed (Polit & Hungler 1993: 250).

### **1.10 ETHICAL CONSIDERATIONS**

Letters were written to the Director General of the Department of Health and Welfare of the Limpopo Province and the Hospital Management for permission to conduct the study. Once permission was granted, informed consent was obtained from the participants to allow them the power of free choice to voluntarily participate in the study or not. Potential subjects were informed that they may withdraw their participation at any time, and that anonymity and confidentiality of the data collected during the study would be maintained. Ethical considerations will be discussed in detail in chapter 3.

### **1.11 PRETESTING THE QUESTIONNAIRE**

Before data collection, the researcher pretested the questionnaire on six diabetics and six family members to increase practical experience with the administration of questionnaires and clarify whether questions were understood. A pretest involves the trial administration of an instrument to identify flaws (Polit & Hungler 1995:38, 711).

### **1.12 DATA ANALYSIS**

After the data was collected it was organised and analysed, using a computer program called SPSS.

### **1.13 AN OUTLINE OF THE CHAPTERS**

The chapter outline of this study is as follows:

- Chapter 1: Overview of the study.
- Chapter 2: Literature review.
- Chapter 3: Research methodology.
- Chapter 4: Data analysis and discussion.
- Chapter 5: Summary, main findings, conclusion, limitations and recommendations.

## 1.14 CONCLUSION

This chapter provided an overview of the study. The research problem was contextualised against background information supported by references to the literature. The purpose of the study, the research objectives, the significance of the research to nursing have been described, and definitions of the key concepts have been provided. The research methodology and method of data analysis were indicated, and an outline of the chapters was given. The next chapter contains the literature review.