CHAPTER ONE:

INTRODUCTION
1.0. Introduction

1.1. Research problem

The word diabetes comes from the Greek word meaning "pass through" or "flow through". This refers to the large amount of urine passed by an untreated diabetic\(^{198}\). The word mellitus means honey referring to the sweet character of the sugar-laden urine\(^{198}\). Diabetes mellitus is an ancient disease. The description of a disease resembling diabetes can be found in the Ebers papyrus of 1550 BC\(^{198}\). Similar descriptions are found in the writings of the Roman physician Galen and Aretaeus of Cappadocia from the second century AD\(^{198}\). Susruta and Charuka reported diabetes from the 5\(^{th}\) century AD. They documented the differences in clinical features of Type 1 and Type 2 diabetes and also the presence of glycosurea\(^{198}\). Avicenna the eminent physician from Arabia in the 10\(^{th}\) century AD noted in addition to the clinical features, some of the complications associated with the diabetic syndrome\(^{198}\). Diabetes was only rediscovered by modern Western medicine in about the 17\(^{th}\) century AD. Since then rapid strides have been made in unraveling the pathophysiology of the disease and its management\(^{198}\). Diabetes mellitus is now seen as a heterogeneous group of diseases characterized by a state of chronic hyperglycemia, resulting from a diversity of aetiology, environmental and genetic, acting jointly\(^{251}\).
Numerous studies have documented that diabetes mellitus is currently one of the most common non-communicable diseases in the world in terms of the number of people affected and considerable associated morbidity and early mortality\textsuperscript{8,233,251}. The World Health Organization (WHO) estimated that 30 million people worldwide had diabetes in the year 1985\textsuperscript{256}. By 1995 this number had been increased to 135 million\textsuperscript{141,256}. The latest WHO estimate for the number of people with diabetes, worldwide in 2000 is 171 million\textsuperscript{257}. WHO estimated that globally, 122\% rise in diabetes, from a total of 135 million in 1995 to 300 million in the year 2025\textsuperscript{141,256}. This would represent more than a twofold global increase, primarily associated with population, aging and growth, as well as from obesity, unhealthy diets and sedentary lifestyle. These latter factors are closely associated with urbanization and industrialization. In terms of prevalence of diabetes by sex, the WHO study estimated that presently there are 73 million women versus 62 million men diabetics. The female excess is pronounced in the developed countries (31 million women versus 20 million men). For the developing countries with younger populations, this sex difference was not observed. WHO estimated that by 2025 the worldwide female/male excess would decrease to 159 million women versus 141 million men, due to aging of the population. The WHO study predicted that between 1995 and 2025 the number of adults affected by diabetes mellitus in developing
countries would grow by 170%, from 84 to 228 million. In developed countries a 42% increase, from 51 to 72 million is predicted. By 2025 developing countries would have 76% of all individuals with diabetes, as compared to 62% in 1995. WHO estimated that by 2025 most people with diabetes in developed nations would be aged 65 years or more, while the majority of diabetic people in developing countries would be in the productive age group of 45 to 65 years. This means that in less than 30 years from now, some 170 million men and women residing in developing countries may be suffering from diabetes in the most productive years of life. For developing countries as a whole, a considerable excess of people affected with diabetes would be residing in the urban areas. Diabetes mellitus is associated with a number of debilitating complications. Retinopathy, nephropathy, neuropathy and accelerated cardiovascular and peripheral vascular disease represent the major cause of morbidity, disability and premature death\textsuperscript{8,12,233,237,244,337}. Retinopathy is a leading cause of visual disability\textsuperscript{8,12}. Diabetes is associated with progressive impairment of kidney function leading to end-stage renal failure\textsuperscript{8,337}. Neuropathic involvement leads to general problems and disabilities in the nerves and premature death\textsuperscript{8,15,237}. The number of deaths attributed to diabetes was previously estimated at just over 800,000\textsuperscript{256}. However, it has long been known that the number of deaths related to diabetes is
considerably underestimated. A more plausible figure is likely to be around 4 million deaths per year related to presence of the disorder\textsuperscript{256}. Many of these diabetes related deaths are due to cardiovascular complications\textsuperscript{256}. Most of them are premature deaths when the people concerned are economically contributing to society\textsuperscript{256}. The economic cost of treating diabetes and diabetes-related complications are significant because of its chronic nature, the severity of its complications and the means required to control them. Diabetes is a costly disease, not only for the affected individual and his/her family, but also for the health authorities\textsuperscript{256}. Direct costs to individuals and their families include medical care, drugs, insulin and other supplies\textsuperscript{256}. Patients may also have to bear other personal costs, such as increased payments for health, life and automobile insurance. Direct costs to the healthcare sector include hospital services, physician services, lab tests and the daily management of diabetes, which includes availability of products such as insulin, syringes, oral hypoglycemic agents and blood-testing equipment. Costs range from relatively low-cost items, such as primary-care consultations and hospital outpatient episodes, to very high-cost items, such as long hospital inpatient stays for the treatment of complications. Direct health care costs of diabetes range from 2.5% to 15% of annual health care budgets depending on local diabetes prevalence and the sophistication of the treatment available\textsuperscript{256}. For most countries, the
largest single item of diabetes expenditure is hospital admissions for the
treatment of long-term complications, such as heart disease and stroke,
kidney failure and foot problems. Many of those are potentially preventable
given prompt diagnosis of diabetes, effective patient and professional
education and comprehensive long-term care. Studies in India estimate that,
for a low-income Indian family with a diabetic adult, as much as 25% of
family income may be devoted to diabetes care. For families in the
United States of America (USA) with a child who has diabetes, the
corresponding figure is 10%. The total health care costs of a person with
diabetes in the USA are between two and three times those for people
without the condition. It was calculated, for example, that the cost of
treating diabetes in the USA constitutes a major health care expenditure
and represents an estimated 15% of USA health care costs annually. In
1997, the total annual medical cost for diabetes in the USA was estimated
to amount $77.7 billion. These numbers do not represent the personal and
social cost associated with diabetes. In WHO’s Western Pacific region a
recent analysis of health care expenditure has shown that 16% of hospital
expenditure was on people with diabetes. In the Republic of the Marshall
Islands, this figure was 25%. Twenty percent of "offshore expenditure" on
health in Fiji was on diabetes related complications for which facilities for
care were not available there. These represent considerable sums for
countries who can ill afford such massive expenditure on preventable conditions. The costs of diabetes that are difficult to quantify are intangible costs, such as pain, anxiety, inconvenience and generally lower quality of life for not only the patient but also his family members. Therefore, the significance of preventing diabetes and its debilitating complications cannot be overemphasized.

1.2. Background and significance of the study

Diabetes Education also termed Diabetes Self-Management Education, (DSME) is the cornerstone of care for all individuals with diabetes. Diabetes Self-Management Education is an interactive, collaborative, ongoing process involving the person with diabetes and the educators. This process includes: 1) assessment of the individual’s specific education needs, 2) identification of the individual’s specific diabetes self-management goals, 3) education and behavioral intervention directed towards helping the individual achieve identified self-management goals and 4) evaluation of the individual’s attainment of identified self-management goals. The benefits of diabetes self-management education have been examined in several studies. Several trials conducted in Type 1 and Type 2 diabetes using a variety of education and nutrition counseling, illustrate the value of diabetes self-management education in improving desired medical outcomes.
value of diabetes self-management education is evident from research demonstrating that patients who never received diabetes education showed a striking fourfold increased risk of major complications\textsuperscript{178}. There is a large body of literature suggesting that at least for the short-term, patient education improved diabetes knowledge, glycosylated hemoglobin, body weight and blood pressure\textsuperscript{25,88,179,180,192}. A systematic review\textsuperscript{179} of the effectiveness of diabetes self-management education in Type 2 diabetes showed positive effect of self-management education on diabetes knowledge and glycaemic control. A meta-analysis conducted by Brown\textsuperscript{41} showed that various educational interventions ranging from written instructions to counseling, group education and individual counseling improved knowledge deficits in adults with diabetes. However many studies\textsuperscript{42-44,181,193} demonstrated modest improvements in glycosylated hemoglobin (GHb) levels and weight loss. A meta-analysis\textsuperscript{45} of the more recent literature reinforces the results that glycosylated hemoglobin level can be reduced dramatically (up to 2.7% points) and other outcomes such as weight loss and adherence indicators significantly improve when accompanied with behavioral modification.

Very few studies are available on diabetes in Yemen\textsuperscript{119,184,257}. WHO estimated that 327,000 people in Yemen had diabetes in the year 2000\textsuperscript{257}. By 2030 this number is expected to increase to 1,286,000 people\textsuperscript{257}. 
Diabetes mellitus in Yemen appears to show a pattern, which is a combination of that found in the developing and the developed countries. The incidence of Type 1 diabetes appears very much like that of developed countries while the profile of Type 2 diabetes is similar to that in any other developing countries. Malnutrition-related diabetes appears to be non-existent. A study conducted by Gunaid et al. to explore the demographic and clinical features of diabetes mellitus in 1095 diabetic Yemeni patients showed that 10.5% had Type 1 diabetes, 58.6% had Type 2 diabetes (non-obese), 26.2% had obesity-related diabetes and 4.7% had impaired glucose tolerance (IGT). The age-sex distribution showed that more females than males were affected and had an early onset of diabetes. Of the 1095 diabetic patients, 31% of Type 2 diabetics were diagnosed before the age of 45 years, while 12% were diagnosed after the age of 65 years. Most Type 2 diabetics were from the higher social strata (professionals and intermediate professionals) and most Type 1 diabetic patients came from the lower or lower middle social classes (skilled manual labor). With respect to family history, 33.7% were Type 1 diabetic patients, 30% of non-obese Type 2 diabetic 39.2% obese Type 2 diabetic patients and 32% IGT patients had first-degree relatives with diabetes.

Considering the direct and indirect costs of diabetes, low-cost interventions to ward off diabetic complications are urgently required in Yemen. Present
study is conducted with this statement in mind. It is the first study to examine the effect of Diabetes Self-Management Education among adult diabetic patients in Yemen Republic.

1.3. Objectives and hypothesis

1.3.1. General objective

- The objective of this study was to identify the effect of diabetes self-management education among adult diabetic patients over 40 years of age attending the Diabetes Center in Sana’a, Yemen Republic.

1.3.2. Specific objectives

1. To determine the impact of diabetes self-management education on diabetes knowledge and its management amongst patients over 40 years of age.

2. To determine the impact of diabetes self-management education on blood glucose levels amongst patients over 40 years of age.

3. To determine the impact of diabetes self-management education on body mass index amongst patients over 40 years of age.
1.3.3. Research hypothesis

There will be a difference in the specific parameters described above between adult diabetic patients who receive diabetes self-management education and those who do not receive diabetes self-management education.