

Pattern of Non Insulin Dependent Diabetes Mellitus in Kuwait

Thesis

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نمط داء السكري غير المعتمد على الإنسولين في الكويت

رسالة

توطئة للحصول على درجة الماجستير
في الصحة العامة

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List of Abbreviations

ADA	: American Diabetes Association
BMI	: body mass index
CDC	: Centers For Disease Control
CHD	: coronary heart disease
CVD	: Cardiovascular disease
DCCT	: Diabetes Control and Complications Trial
DKA	: Diabetic Keto Acidosis
DM	: Diabetes Mellitus
DPP	: Diabetes Prevention Program
DPS	: Diabetes Prevention Study
EMRO	: Eastern Mediterranean Regional Office
ESRD	: end-stage renal disease
FFA	: Free fatty acids
FPG	: fasting plasma glucose
GAD	: Glutamic Acid Decarboxylase
GADAbs	: Glutamic Acid Decarboxylase Auto-antibodies
GDM	: Gestational Diabetes Mellitus
GFR	: glomerular filtration rate
GHb	: Glycated hemoglobin
GSA	: glycated serum albumin
GSP	: glycated serum proteins
HDL	: High-density lipoprotein
HNF	: Hepatocytes Nuclear Factor
IAAs	: Insuline Auto-Antibodies
ICAs	: Islet Cell Antibodies
IDF	: International Diabetes Federation
IFG	: impaired fasting glycaemia
IGT	: impaired glucose tolerance
IPF	: Insulin Promotor Factor
LDL	: low-density lipoprotein

LPL : LipoProtein Lipase
MODY : Maturity-onset diabetes of the young
NCD : non-communicable diseases
OGTT : Oral glucose tolerance test
PPAR : Proximase Prolifrador Activated Receptor
PPG : postprandial glucose
TGS : Triglycerides
US : United State
VLDL : Very low density lipoprotein
WHO : World Health Organization

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Introduction

The non-communicable diseases (NCD) epidemic has overwhelmed the historical health problems and is now the leading cause of mortality. Within the cluster of NCD, diabetes has become one of the most daunting causes of sickness and death. The number of people with diabetes worldwide is currently estimated to be about 190 million. By 2025, this number is expected to increase to over 330 million, with the majority of cases being type 2 diabetes, Centers for Disease Control (**CDC, 2005**).

Type 2 diabetes is one of the major public health concerns in both developing and developed countries. Type 2 diabetes is the most common metabolic disorder worldwide (**Goldstein, 2003**), and its prevalence is growing at an alarming rate in both developed and developing countries (**Wild et al., 2004; Yach et al., 2006**). It has become epidemic in a number of countries, particularly in newly industrialized nations. The direct and indirect social and economic costs of treating diabetes and its complications have the potential to cripple the countries' healthcare budgets.

Type 2 diabetes is associated with considerable morbidity and mortality, which can lead to substantial personal and societal costs (**Yach et al., 2006**). In 2002, in the United State (US) alone, direct and indirect costs attributable to diabetes were estimated at US\$132 billion by the American Diabetes Association (ADA). This estimate does not include many intangible costs, such as pain and suffering (**Hogan et al., 2003**).

Surveys of representative Kuwaiti population samples documented the increasing prevalence of diabetes. One large survey carried out in Kuwait in collaboration with the Eastern Mediterranean Regional Office (EMRO) of the World Health Organization (WHO) revealed that the overall prevalence of diabetes in Kuwait is 11.2% (**Al-Nesf et al., 2008**). In Kuwait, as well as in other countries, type 2 diabetes constitutes the majority of diabetes cases.

The high and increasing prevalence of diabetes can be attributed to many factors. Socio-demographic factors, especially ageing of the population have been shown to play an important role increasing the prevalence of diabetes (**Al-Nesf et al., 2008**). Another factor to take into account is the recently observed increase in diabetes prevalence (**Johnson et al., 2006; WHO, 2003; International Diabetes Federation (IDF), 2006**),

probably reflecting changes in obesity and lifestyle factors (**Lamacchia et al., 2009; Aljoudi and Taha, 2009**).

Poor glycaemic control is a major reason for the high incidence of microvascular complications of the eyes, kidneys, and nerves in people with diabetes. One study clearly demonstrated the benefits of improved glycaemic control in reducing the incidence and progression of retinopathy in people with diabetes (**Zoega et al., 2005**). Another study showed reductions in incidence of diabetes-related complications with intensive glycaemic control in a sample of patients with type 2 diabetes (**Cheng and Fantus, 2005**).

Cardiovascular disease (CVD) is the leading cause of death among diabetics, and is responsible for much of the increase in diabetes-related morbidity and mortality. CVD-related mortality is 2–4 times higher among diabetics (**CDC, 2005**). Atherosclerosis, hypertension, and stroke are common problems affecting individuals with diabetes, all of which correlate highly with the presence of obesity (**CDC, 2005; Glendening et al., 2005**). A cluster of interrelated cardio-metabolic risk factors is closely related to the development of type 2 diabetes and CVD. Current views suggest that cardio-metabolic risk factors represent a continuum of disease risks – not merely the presence or absence of a distinct disease entity (**Eckel et al., 2006**). Obesity, hyperglycemia and insulin resistance,

dyslipidaemia, inflammation, and hypertension represent interrelated therapeutic targets in the battle against the increasing prevalence of type 2 diabetes (**Eckel et al., 2006**).

There is irrefutable evidence that diabetes can be prevented or delayed in people at high risk, and that the progression of many of the complications associated with diabetes can be halted. Appropriate diet and physical activity, maintaining a healthy body weight, refraining from tobacco smoking, and proper control of diabetes and blood pressure in people with diabetes will help prevent diabetes and reduce its complications. The means to do this are within the reach of most countries' budgets including Kuwait. Appropriate guidelines for the prevention and control of diabetes, and proper set up systems are required to ensure that these guidelines are adhered to (**IDF, 2006**).

Kuwait is formed of five health districts. Each is covered by a general hospital and a number of primary health care centers. Each primary health care center has a well defined catchment area. All patients in the catchment area have medical files. Any patient must be registered in the primary health care center. Referral to hospitals or any other specialized health care centers is through the primary health care center. Diabetics are followed up in the primary health care center. Confirmation of diabetes diagnosis is performed in either a diabetes center or an

outpatient clinic of a general hospital. Advanced therapy and medical care is carried out in these establishments yet, cases are referred back to the primary health care center for follow up and receiving medical care, laboratory investigations and receiving health instructions.

Using the highly comprehensive data from the diabetes care programme of Kuwait, this study was performed to provide the most up-to-date nation-wide estimates for prevalence and newly diagnosed cases in all of Kuwait. It will also provide data for the magnitude of the associated complications and the degree of control among cases. .