CHAPTER 6

TYPE 2 DIABETES MELLITUS,
PANDEMIC IN 21st CENTURY

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Abstract: In the second half of the 20th century it became obvious that a relentless increase in
Type 2 diabetes mellitus (T2DM), affecting the economically affluent countries, is
ggradually afflicting also the developing world. This chapter shows the threat that the
T2DM epidemic represents to mankind, with the astonishing recent discoveries on
the role of obesity and of body fat in this metabolic disorder. Presently, the highest
prevalence of T2DM is in Saudi Arabia. T2DM is very high in over 10% of adults
in the USA, Switzerland and Austria. Prevalence is low in Norway, China and in
Iceland. Predictions of epidemiologists for the first third of the 21st century claim
up to 2.5 times increase in the prevalence of T2DM in the Middle East, Sub-Saharan
Africa, India, rest of Asia and in the Latin America. In China the number of patients
with T2DM will double in 2030. In the economically advanced countries the increase
will be about 50% in 2030.

Increasing urbanization, aging populations, obesity and falling levels of
physical activity are all contributing to the rise of T2DM worldwide. The main
cause of T2DM pandemic is growing prevalence of obesity in Europe and USA.
In the North America and European Union countries obesity is considered to be
responsible for up to 70-90% of T2DM in adult population. The precise mechanism
by which obesity leads to insulin resistance and to T2DM is not completely known
but it may be related to several biochemical factors such as abnormalities in free
fatty acids, adipokines, leptin and other substances.

INTRODUCTION

Type 2 diabetes mellitus (T2DM), formerly known as non-insulin-dependent
diabetes mellitus or adult-onset diabetes, is a metabolic disorder that is characterized
by high levels of blood glucose as a result of insulin resistance and relative insulin
deficiency. The classical symptoms of T2DM are frequent urination, increased thirst,
fatigue and weight loss. T2DM is due to a combination of lifestyle and genetic factors.
Environmental toxins may also be contributory to recent increases in the rate of T2DM.
Having relatives with T2DM increases risks of developing T2DM very substantially in
the family. Environmental factors, especially diet and obesity play a large part in the
development of T2DM in addition to any genetic component. Insulin resistance means
that human tissues do not respond appropriately when insulin is present. Unlike Type 1
diabetes mellitus, insulin resistance is generally a problem of insulin receptors of the cells
which do not respond appropriately to insulin rather than a problem with the production of
insulin. The World Health Organization (WHO) definition of T2DM is increased glucose
levels on two occasions: Of either fasting plasma glucose ≥7.0 mmol/L or with a glucose
tolerance test, two hours after the oral dose a plasma glucose ≥11.1 mmol/L. Onset of
T2DM can be prevented through proper nutrition and regular exercise. Recent studies
have linked obesity and T2DM to insulin resistance in the brain and neurodegeneration.

PRESENT PREVALENCE AND FUTURE TRENDS OF T2DM

According to the International Diabetes Federation,1 highest prevalence of T2DM is
in Saudi Arabia where wealth, derived from oil, results in frequent obesity. A dramatic
rise in obesity in the US resulted in 11% of adults being diabetics. In Europe, most T2DM
is in the central region: Switzerland, Austria, Hungary and the Czech Republic (Fig. 1).
Scandinavians are less affected and least T2DM (only 2%) is reported from Iceland.

Diabetes prevalence in adult population (20-79 y.) in 2007

![Graph showing diabetes prevalence in adult population in 2007 (20-79 years)](image)

Figure 1. Diabetes prevalence in adult population in the world.