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Introduction

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1.1 INTRODUCTION TO THE SECOND EDITION

It has been seven years since the first edition of *The Epidemiology of Diabetes Mellitus. An International Perspective* appeared. The volume was generally saluted as an excellent initiative: ‘... an extremely welcome, timely and important compilation. . .’ (*Diabetes/Metabolism*, July/August 2002); ‘... a welcome and innovative addition to the lamentably few texts available on the subject. . .’ (*International Journal of Epidemiology*, vol. 31, No. 4, 2002); ‘... a good primer for clinicians and researchers. . .’ (*Trends in Endocrinology and Metabolism*); ‘... This book provides an excellent update on aetiological aspects in type 1 as well as type 2 diabetes . . . the editors have done a very good job. . .’ (*Diabetologia*, January 2003). The reviews went on hoping that ‘. . . this book will contribute to change our attitude. . .’ (*Acta Cardiologica*, October 2002) and that ‘. . . it was just the first edition of what will become the definitive textbook in the field (of Diabetes Epidemiology). . .’ (*British Medical Journal*, 6 April 2002).

Our objective with the first edition was to bridge the two decades that had passed since Dr Kelly’s West landmark monograph on *Epidemiology of Diabetes and Its Vascular Complications* and to give a broader review of recent epidemiological

studies spanning the globe, different nations and cultures.

It is now clear that the bulk of the pandemic of diabetes sweeping the world (as a result of increasing obesity, physical inactivity, other environmental determinants, including intrauterine influences as well as increased longevity) will emerge in non-Europid populations. By considering diabetes in relation to different ethnic groups, cultures and geographical settings, much can be learned about the natural history, the risks, the manifestations and the complications of diabetes itself. We attempted to address these issues in the first edition.

Encouraged by the response to the first edition, we have now embarked on this second edition. This edition does not simply represent an update of the previous volume. We have also been attentive to various criticisms and suggestions in an attempt to enhance the previous edition. Therefore, several new chapters have been added, a new coeditor, Marian Rewers, introduced and many new authors asked to contribute.

In the first edition, insufficient attention was given to research exploring the effect of early life influences (such as poor growth *in utero* and childhood velocities) in determining the risk of diabetes and its associated vascular complications. This issue is discussed in this volume.

The global pandemic of diabetes is already a worldwide public health catastrophe. Action is needed at various levels. A new section in this edition focuses on screening and prevention of diabetes. This second edition, which might as well be entitled as *New Trends in Diabetes Epidemiology and Prevention*, has been extensively reorganized, with seven major subdivisions.

1. Definitions, classification and risk factors for diabetes, including the epidemiology of the metabolic syndrome or cardiometabolic risk, the epidemiology of obesity and diabetes, nutrition and diabetes, physical activity and diabetes, as well as the genetic epidemiology of type 2 diabetes.
2. Type 2 diabetes around the world. Recent data worldwide (different continents and populations) have been incorporated in this section. A specific chapter deals with the epidemiology of type 2 diabetes in children and adolescents.
3. Type 1 diabetes around the world. Global epidemiology of type 1 diabetes is presented in this section, as well as ethnic differences and genetic epidemiological components of type 1 diabetes.
4. New evidence for screening and prevention of diabetes. This section encompasses chapters on new approaches to screening and the prevention of type 1 diabetes, as well as chapters on nonpharmacological and pharmacological approaches for prevention of type 2 diabetes.
5. Epidemiology of complications. The epidemiological aspects of both acute and long-term complications of diabetes are discussed in this section in seven chapters.
6. Implications. This section deals with the diabetes economic burden from a worldwide perspective. A new chapter on the daily fight against diabetes presents clinical guidelines worldwide designed to obtain the best glycemic control.
7. New challenges. In this final section, new challenges such as antipsychotic treatment, the human immunodeficiency virus (HIV) and coexisting problems of glucose tolerance abnormalities are discussed.

Three chapters have been replaced. The chapter on 'Epidemiology of Diabetes in Mexico' is now

part of Chapter 12. The chapter on 'Diabetes Field Surveys: Theory and Practical Aspects' has been omitted, although it remains important for those willing to conduct field surveys. This information can easily be retrieved if needed (from G.K. Dowse's Chapter 24 (pp. 399–423) in the first edition of the book). The chapter on 'Malnutrition-Related Diabetes Mellitus: Myth or Reality' has also been omitted this time due to the lack of additional compelling new data since 2001. The 'enigma' has not yet been resolved.

We expect that this new edition will be of great interest for professionals engaged in diabetic medicine, be they epidemiologists, physicians, nurses, nutritionists, dietitians, psychologists, physiologists, social scientists or economists. Its multi-author approach and detailed sections should also be of interest to the research scientist, public health specialists and other health care providers.

1.2 INTRODUCTION TO THE FIRST EDITION

Twenty-three years ago Dr Kelly West published the first volume on the epidemiology of diabetes and its vascular complications [1]. He left his own unique memorial in a book that critically reviewed more than 2000 papers. This outstanding review gathered most of the contributions, clinical and population based, on the subject of diabetes epidemiology and highlighted the many gaps in our diabetes epidemiology knowledge at that time.

Much has happened in the last two decades. The present volume bridges the more than twenty years that have elapsed since Dr Kelly West's milestone monograph and we hope that it will provide a stimulating 'state-of-the-art' review of recent epidemiological studies spanning the globe.

The book presents and discusses the new diagnostic criteria and classification of diabetes. At the end of the 1970s confusion reigned both with regard to the classification of diabetes and to the appropriate diagnostic tests and their interpretation. Enormous variation in diagnostic cutoff values, in size of the glucose load and clear definition of types of diabetes prevailed. In 1979 and 1980 the National Diabetes Data Group (NDDG) in the United States [2] and the World Health Organization (WHO) Second Expert Committee on Diabetes [3] brought some order. Further revisions have resulted in new

recent classification and diagnostic criteria that seem to be more consistent and less controversial [4, 5]. One of the major changes in the provisional WHO consultation report is the disappearance of the malnutrition-related diabetes mellitus (MRDM) as a major category [4]. While the protein-deficient pancreatic diabetes (PDPD) variant of MRDM has been dropped, the former fibrocalculous pancreatic diabetes (FCPD) variant is now part of the other types category which include all those types where etiology is more clear. A chapter discusses this issue. One major difference remains in gestational diabetes mellitus (GDM). The American Diabetes Association (ADA) has not changed its testing and criteria, whereas the WHO includes both impaired glucose tolerance (IGT) and new diabetes in pregnancy under the banner of GDM [4, 5]. Compared with what was reigning in the 1970s, this is 'order out of chaos'. However, there is still room for improvement.

The available diagnostic criteria and classification have been widely used since the early 1980s in numerous epidemiological studies, allowing comparisons between countries, regions and different populations worldwide. The results of these studies suggest that the prevalence of diabetes will increase dramatically in the next quarter of this century, both in developed and the developing countries. The WHO [6] suggests an increase worldwide of the prevalence of diabetes in adults of 35% and an increase in the number of people with diabetes of 122%. Developing countries will face an increase of 48% in the prevalence of diabetes and an increase of 170% in the number of people with diabetes, compared with an increase in the prevalence of diabetes of 27% in developed countries and an increase of 42% in the number of people with diabetes.

Although caution should be expressed regarding these figures due to the lack of suitable survey data, and extrapolations in some places and countries, the epidemic nature of diabetes in the world is supported by studies summarized in this book.

The likely burden of diabetes during the first years of the twenty-first century should not be overlooked: Figures of 135 million adults with diabetes in 1995 rising to probably 300 million in year 2025 are not far from reality and may even underestimate the magnitude of this major public health problem. Application of new diagnostic criteria will probably add another 2% in the

prevalence of diabetes. The greater longevity of women likely explains the fact that there are more women than men with diabetes in many countries. The increasing concentration of diabetes in urban areas of developing countries is notorious and clearly emerges from the reported surveys.

There is now considerable evidence that type 2 diabetes is lifestyle related. Given the dramatic change of lifestyle in many developing nations, researchers have had great opportunities to study the genetic and environmental determinants of type 2 diabetes through both cross-sectional and longitudinal studies. The book presents an extensive overview of these studies and focuses on evidence for prevention of diabetes.

In the last 20 years, dramatic changes in the management of type 1 diabetes have positively modified the natural history of this disorder. The benefits of tight metabolic control have been demonstrated in numerous studies, and most conclusively in the Diabetes Control and Complications Trial (DCCT) for type 1 diabetes [7] and in the United Kingdom Prevention Diabetes Survey (UKPDS) for type 2 diabetes [8–11]. An upsurge of interest in diabetes epidemiology that started in the early 1980s was immensely reinforced. Although incidence and prevalence data have added only limited information to our further understanding of the etiology of diabetes, their importance in adding to our knowledge of the public health implications of this disease is considerable. Evidence for prevention is surely emerging and is thoroughly discussed in this volume.

Following the euphoria of the discovery of insulin in the 1920s appeared the recognition of most of the disorders due to diabetic complications. The natural progression of the disease to nephropathy and retinopathy led to renal failure and blindness. The consequences of cardiovascular disease and neuropathy resulted in early cardiovascular death, foot disease and amputations. Although it is now possible to reduce the incidence of complications, or, when they occur, retard their progression, their prevalence and incidence remain unacceptably high. The book addresses the magnitude of diabetic complications, time trends and geographical variations.

Proper care of diabetes in the 2000s implies identification of all patients with diabetes and early detection of complications which will enable

care providers to take the steps needed to combat the disease. This may not be possible at all in the absence of epidemiological data. This book, therefore, will be a very useful tool for diabetes care providers, researchers and public health experts. It provides a global picture of the characteristics of the epidemic nature of diabetes and its complications. It is hoped that those of all disciplines involved in diabetes, regardless of their fields of expertise, will find both interest and practical help from its content.

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