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Sex and Gender in Diabetes

What is Diabetes?

Diabetes is a complex metabolic disease characterised by elevated blood glucose (sugar) levels. The increased glucose levels cause serious damage, especially to the eye, kidney, nerves, heart and blood vessels. Insulin is a hormone produced by the pancreas that regulates blood glucose. Type 1 diabetes occurs when the pancreas produces no insulin based on impaired autoimmunity; its cause and preventative measures are largely unknown. Type 2 diabetes, which is the most common form, occurs when the body does not produce enough insulin and the insulin that is produced does not work properly. It often results from excessive body weight and lack of exercise, but genetic and environmental factors also play a role. Gestational Diabetes Mellitus (GDM) occurs in women during pregnancy.³ Oral glucose tolerance tests are useful tools for the detection of early forms of diabetes.

How Big is the Problem?

Diabetes is the fourth most common cause of death in the European Union, accounting for over 9% of total health budget spending in the region. In 2013, diabetes affected an estimated 32 million people, over 8% of the population, in the EU. Every two minutes, someone in the EU dies from complications from a disease related to diabetes.^{16,17}

Diabetes accounts for 11% deaths in Europe among those ages 20 to 79. More men die of diabetes than women under the age of 70, but women have a higher rate of death from diabetes than men after the age of 40. For women, diabetes is the 9th leading cause of death in high-income countries and is becoming one of the most common non-communicable diseases globally.⁴ Prevalence of diabetes is increasing in every country across Europe each year. Both men and women of different ethnic groups appear to have an increased risk of diabetes. For both men and women, the rate of diabetes increases with age.

Although the trends are changing with time, men have a higher rate of death from diabetes than do women, accounting for 15 deaths per 100,000 population for men compared to 12 deaths per 100,000 people in women. Markedly, the death rate of men under the age of 65 with diabetes is twice that of women. Some studies indicate that men are less likely to be diagnosed with diabetes than women due to the underutilisation of health services by many men, although, in the EU, men have higher rates of hospital admission from diabetes than do women.¹⁸

Why Gender Matters: Biological Differences

For younger women, diabetes can be a hard burden to carry. Fluctuations in hormone levels occur through the menstrual cycle and these fluctuations can affect blood sugar control. Many women find their blood sugar tends to be high 3-5 days before their periods and need perimenstrual changes of their insulin doses.⁵

Increasing rates of obesity, smoking and sedentary lifestyles in both men and women are putting them at risk of type 2 diabetes. This is compounded by women's greater longevity. In some Member States, like the Czech Republic, Greece, Hungary, Malta, Slovakia and Sweden, more women have diabetes than men. In other Member States, the gap in diabetes prevalence between men and women is narrowing.

Diabetes in Women: Link to Cancer

Both Diabetes type 1 and type 2 are linked to increased rates of colorectal, liver and pancreatic cancers. Type 2 diabetes has been connected to increased breast cancer; women 55 years and older with diabetes were 30% more likely to be diagnosed with breast cancer than women without diabetes.⁹

Diabetes and Cardiovascular Disease (CVD): The Interconnection

Diabetes and CVD are strongly interconnected. Diabetes is now regarded as the biggest risk factor for heart disease, especially in women. People with diabetes are at a greater risk of developing CVD such as heart attack and stroke, if the disease is left undiagnosed or poorly controlled.⁶ Diabetic women have a greater risk of heart disease and at a younger age compared with non-diabetic women. Although pre-menopausal women without diabetes have a lower risk of heart disease than men, it appears that the protective benefit of female hormones is lost in women with diabetes, regardless of age. The relative risk of death from heart disease associated with type 2 diabetes is about 50 percent greater in women than it is in men.⁷ Recognising that diabetes and CVD are closely interconnected, cardiologists of the European Society of Cardiology and diabetologists of the European Association for the Study of Diabetes, joined forces to develop evidence-based guidelines to improve the quality and management in diagnosis and care of both CVD and diabetes.⁸

Diabetes and Depression

The rate of depression in people with diabetes is twice that in the general population. Women experience depression about twice as often as men, with higher rates of depression in women with diabetes. Depression affects quality of life, reduces the ability to self-manage diabetes and increases the risk of complications, heart disease and premature mortality. The underlying mechanisms for the increased mortality risk associated with depression are not well understood and need to be studied further. Increased awareness of depression in women with diabetes by health professionals may lead to better management of both conditions and improve outcomes.¹⁰

Diabetes and Osteoporosis

Women with diabetes should pay special attention to their bone health, already an important health consideration for older women. Women with type 1 diabetes have reduced bone mass and an increased risk of fragility fractures compared to those without it. Those with diabetes type 2 are particularly susceptible to low trauma fractures, especially hip fractures.¹¹

Socioeconomic Status, Gender and Diabetes

Throughout Europe, people with low education levels are more likely to develop diabetes and die as a result. Women with a low educational level have higher mortality rates from diabetes than men with similarly low education in Europe. The greater coronary heart disease risk associated with diabetes seen in women may reflect a treatment bias that favours men.¹²

Diabetes and Pregnancy: Gestational Diabetes

Women with type 1 or type 2 diabetes who have uncontrolled or undiagnosed diabetes during pregnancy are at increased risk of complications which can affect mother and child health. Such complications can range from miscarriage to premature or stillbirth to serious birth defects with the heart, brain and spine being particularly affected. Uncontrolled diabetes may make the baby grow excessively large which can cause complications during delivery for mother and child. Preeclampsia, which can lead to stroke or seizures, is also more likely in women with uncontrolled diabetes. In later life, infants of mothers with diabetes are more likely to become obese or overweight.^{13,14} In 2009, the International Diabetes Federation produced Global Guidelines for pregnancy and diabetes.¹⁵

Gestational diabetes mellitus (GDM), a form of diabetes that develops in pregnancy, increases the risk of perinatal complications for both mother and child. GDM can also lead to high amniotic fluid levels, high infant weight and its associated delivery complications, and disturbed placental development. These women and their infants are at heightened risk of developing type 2 diabetes and cardiovascular disease; half of women with GDM will develop type 2 diabetes within five to ten years after pregnancy. It is estimated that 2-6% of pregnancies in Europe result in gestational diabetes. The prevalence may be higher in Southern Mediterranean countries and lower in Northern EU countries. The exact number of women with GDM is unknown but studies show that the prevalence of GDM is increasing. Throughout the EU, screening and policy varies because of a lack of consensus on testing, diagnostic procedures, and screening efforts.¹⁴ In 2014, the WHO adopted the evidence-based guidelines of the International Association of Diabetes and Pregnancy Study Groups. Regular check-ups and information about preventative measures should be given to all women that experiences GDM, because many women develop after pregnancy, which could be potentially avoided.

ABOUT THE EUGENMED PROJECT

Research addressing sex and gender (S&G) in biomedical sciences and health research is emerging as a novel and highly promising field. This interaction between S&G leads to different manifestation of diseases—such as infarction, heart failure, diabetes, rheumatic disease—in women and men.

Research in the area will lead to novel, better targeted and, therefore, to more efficient treatment strategies than the previous global approaches, creating additional opportunities for prevention and increased healthy life expectancy.

The EUGenMed Project is coordinated by Charité, Universitätsmedizin Berlin in partnership with the European Institute of Women's Health and the University Maastricht. The Project is funded by the European Commission under the Seventh Framework Programme and began on October 1st 2013. The Project aims to create a multi-sectorial source of knowledge based on consensus of experts.

Six meetings, including four workshops on specific S&G themes, of multi-sectorial and multidisciplinary groups of key stakeholders will be held by EUGenMed Project partners on a variety of topics related to S&G in health. These meetings will generate recommendations, guidelines and teaching materials for the implementation of S&G research for target audiences, doctors, medical associations, teachers, students, researchers, industry, health policy makers, funding agencies and politicians. Materials will be disseminated through a European Gender Health Portal.

The EUGenMed Project will produce an innovative roadmap for implementation of S&G in in biomedicine and health, based on the generation of material and results from four workshops and the final project conference.

For more information, please visit the EUGenMed website: <http://eugenmed.eu>.



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