

Gender Differences in Diabetes: Biological, Hormonal, and Socio-Cultural Influences on Disease Management and Outcomes

Rita Vejola*

Department of Clinical Medicine, Oulu University Hospital, Finland

Corresponding Author*

Rita Vejola

Department of Clinical Medicine, Oulu University Hospital, Finland

E-mail: rita.vejola@oulu.fi

Copyright: © 2024 Vejola R. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Received: 01-July-2024, Manuscript No. jdm-24-33286; **Editor assigned:** 03-July-2024, PreQC No. jdm-24-33286; **Reviewed:** 17-July-2024, QC No. jdm-24-33286; **Revised:** 21-July-2024, Manuscript No. jdm-24-33286; **Published:** 28-July-2024, DOI: 10.35248/2155-6156.10001142

Abstract

Diabetes mellitus is a chronic condition affecting millions worldwide, with significant gender-specific differences in prevalence, complications, and management. This article explores the distinct aspects of diabetes in men and women, examining how biological, hormonal, and socio-cultural factors influence the onset, progression, and treatment of the disease. Understanding these differences is crucial for developing gender-sensitive approaches to diabetes care and improving outcomes for all patients.

Keywords: Gender differences; Diabetes mellitus; Insulin sensitivity; Hormonal influence; Socio-cultural factors; Cardiovascular disease; Diabetic nephropathy; Diabetes management; Personalized treatment; Health-seeking behavior; Lifestyle modifications

Introduction

Diabetes mellitus, encompassing Type-1 and Type-2 diabetes, is a global health concern with rising prevalence. Gender differences in diabetes have been increasingly recognized, necessitating a deeper understanding of how men and women are differently affected by and manage this condition. This article aims to provide a comprehensive overview of these differences, highlighting the need for personalized approaches to diabetes management [1].

Epidemiology

Epidemiological studies indicate that the prevalence of Type-2 diabetes is higher in men than women, although women tend to develop the disease at a later age. Type-1 diabetes does not show a significant gender disparity in incidence. However, differences in lifestyle, body composition, and hormonal changes across genders contribute to varying risk profiles and outcomes.

Biological and hormonal factors

1. **Insulin sensitivity and secretion:** Women generally exhibit greater insulin sensitivity compared to men, partly due to differences in body fat distribution. However, hormonal fluctuations during menstrual cycles, pregnancy, and menopause can impact insulin sensitivity and glycemic control in women.

2. **Hormonal influence:** Estrogen plays a protective role in glucose metabolism, which may contribute to the delayed onset of Type 2 diabetes in premenopausal women. Postmenopausal women experience a higher risk due to decreased estrogen levels.

Socio-cultural and behavioral factors

1. **Health-seeking behavior:** Women are more likely to seek medical advice and adhere to treatment regimens than men. However, they may face more barriers to accessing healthcare, including socio-economic constraints and caregiving responsibilities.

2. **Lifestyle and physical activity:** Men are generally more physically active than women, which can influence the management and progression of diabetes. Sedentary lifestyles and obesity, more prevalent among women in certain cultures, further exacerbate diabetes risk.

Complications and comorbidities

1. **Cardiovascular disease:** Diabetes significantly increases the risk of cardiovascular disease (CVD) in both genders, but women with diabetes have a relatively higher risk of CVD-related mortality compared to men. The protective cardiovascular effects of estrogen are lost in postmenopausal women, elevating their risk.

2. **Diabetic nephropathy:** Men are more prone to developing diabetic nephropathy than women, potentially due to differences in renal structure and function. However, women with diabetes are at higher risk for end-stage renal disease (ESRD).

Management and treatment

1. **Pharmacological interventions:** Gender differences in pharmacokinetics and pharmacodynamics necessitate tailored treatment strategies. Women may respond differently to certain diabetes medications due to hormonal influences and body composition.

2. **Lifestyle modifications:** Gender-specific programs promoting physical activity and healthy eating are essential. For women, addressing barriers such as time constraints and caregiving responsibilities is crucial.

Discussion

The gender differences in diabetes underscore the need for a multifaceted approach to disease management, considering the complex interplay of biological, hormonal, socio-cultural, and behavioral factors. This discussion delves into the critical aspects identified in the literature, exploring potential strategies to address these differences and improve health outcomes for both men and women [2-4].

Biological and hormonal factors

The role of estrogen in glucose metabolism highlights the necessity of considering hormonal status in managing diabetes among women. For instance, premenopausal women might benefit from strategies that leverage their natural insulin sensitivity, while postmenopausal women may require more aggressive interventions to manage their increased risk. Hormone Replacement Therapy (HRT) has been considered for mitigating some of these risks, but its use must be balanced against potential side effects, such as an increased risk of certain cancers and cardiovascular events. For men, understanding the impact of testosterone on insulin sensitivity and fat distribution can inform targeted lifestyle and pharmacological interventions. Additionally, recognizing that men generally have higher visceral fat—a significant risk factor for insulin resistance—can help tailor weight management and exercise programs to mitigate this risk [5,6].

Socio-cultural and behavioral factors

The gender differences in health-seeking behavior and lifestyle choices necessitate tailored health promotion strategies. Women's higher likelihood of seeking medical advice and adhering to treatment regimens should be supported by addressing barriers such as socio-economic constraints and caregiving responsibilities. Outreach and education programs can be

designed to accommodate women's schedules and responsibilities, ensuring better access to diabetes care and resources. Conversely, strategies for men might focus on increasing their engagement with healthcare systems and emphasizing the importance of regular monitoring and early intervention. Men's generally higher levels of physical activity should be harnessed in diabetes prevention and management programs, promoting activities that reduce the risk of insulin resistance and improve overall metabolic health [7].

Complications and comorbidities

The heightened risk of cardiovascular disease (CVD) among women with diabetes, particularly postmenopausal women, necessitates a proactive approach to cardiovascular health in this population. Regular screening for cardiovascular risk factors, coupled with aggressive management of blood pressure, lipids, and glucose levels, is essential. Additionally, lifestyle interventions promoting heart-healthy diets and regular physical activity should be emphasized. For men, the focus on preventing diabetic nephropathy and managing its progression is critical. This involves stringent control of blood glucose levels, blood pressure, and early intervention with medications such as ACE inhibitors or ARBs. Given the higher prevalence of diabetic nephropathy in men, regular monitoring of kidney function and prompt treatment of any abnormalities are crucial [8].

Management and treatment

Personalized treatment plans that consider gender-specific responses to pharmacological interventions can enhance the effectiveness of diabetes management. For example, women may require adjustments in medication dosages due to differences in body composition and hormonal influences. Additionally, healthcare providers should be aware of potential side effects that may differentially affect men and women, tailoring treatment plans accordingly. Lifestyle modifications remain a cornerstone of diabetes management. Gender-specific programs that address unique barriers and motivators can significantly impact diabetes control. For women, programs that integrate physical activity into daily routines and provide support for managing family and work responsibilities can be beneficial. For men, promoting consistent health check-ups and fostering environments that support healthy lifestyle choices can enhance adherence to diabetes management plans [9].

Future research and policy implications

Further research is needed to elucidate the underlying mechanisms driving gender differences in diabetes. Longitudinal studies examining the impact of hormonal changes, genetic factors, and lifestyle interventions across genders can provide deeper insights. Additionally, policy initiatives aimed at reducing healthcare disparities and ensuring equitable access to diabetes care for men and women are essential [10].

Conclusion

Recognizing and addressing gender differences in diabetes is vital for improving patient outcomes. Healthcare providers should adopt a gender-sensitive approach, considering biological, hormonal, and socio-cultural factors in the management of diabetes. Further research is needed to develop targeted interventions and guidelines that cater to the unique needs of men and women with diabetes.

References

1. Estruch R, Ros E, Sala-Salvado J, Covas MI, Corella D, et al. (2018) Primary Prevention of Cardiovascular Disease with a Mediterranean Diet Supplemented with Extra-Virgin Olive Oil or Nuts. *N Engl J Med* 378: e34.
2. Wing RR, Lang W, Wadden TA, Safford M, Knowler WC, et al. (2011) Benefits of modest weight loss in improving cardiovascular risk factors in overweight and obese individuals with type 2 diabetes. *Diabetes Care* 34: 1481–1486.
3. Pi-Sunyer X, Astrup A, Fujioka K, Greenway F, Halpern A, et al. (2015) A Randomized, Controlled Trial of 3.0 mg of Liraglutide in Weight Management. *N Engl J Med* 373: 11-22.
4. Lee PC, Tan HC, Pasupathy S, Ganguly S, Eng AKH, et al. (2018) Effectiveness of bariatric surgery in diabetes prevention in high-risk Asian individuals. *Singapore Med J* 59: 472-475.
5. Harris L-A, Kayser BD, Cefalo C, Marini L, Watrous JD, et al. (2019) Biliopancreatic Diversion Induces Greater Metabolic Improvement Than Roux-en-Y Gastric Bypass. *Cell Metab* 30: 855–864.
6. Niemann MJ, Tucker LA, Bailey BW, Davidson LE (2020) Strength Training and Insulin Resistance: The Mediating Role of Body Composition. *J Diabetes Res* 2020: 7694825.
7. Dubé JJ, Allison KF, Rousson V, Goodpaster BH, Amati F (2012) Exercise dose and insulin sensitivity: relevance for diabetes prevention. *Med Sci Sports Exerc* 44: 793-799.
8. Dela F, Prats C (2014) Exercise Interventions to Prevent and Manage Type 2 Diabetes: Physiological Mechanisms. Jørn Wulff Helge Goedecke JH, Ojuka EO (eds): *Diabetes and Physical Activity*. *Med Sport Sci*. Basel Karger 60: 36–47.
9. DeFronzo RA, Tripathy D, Schwenke DC, Banerji MA, Bray GA, et al. (2011) Pioglitazone for Diabetes Prevention in Impaired Glucose Tolerance. *N Engl J Med* 364: 1104-1115.
10. Inzucchi SE (2006) Clinical practice. Management of hyperglycemia in the hospital setting. *N Engl J Med* 355: 1903-1911.