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# Challenges in diabetes education for integrating gender perspective

**T**he gender perspective in health is an approach that recognizes how biological, social, and cultural factors influence the health of women and men differently. In this article, we briefly share how this viewpoint can contribute to therapeutic education to improve the care of people living with diabetes.

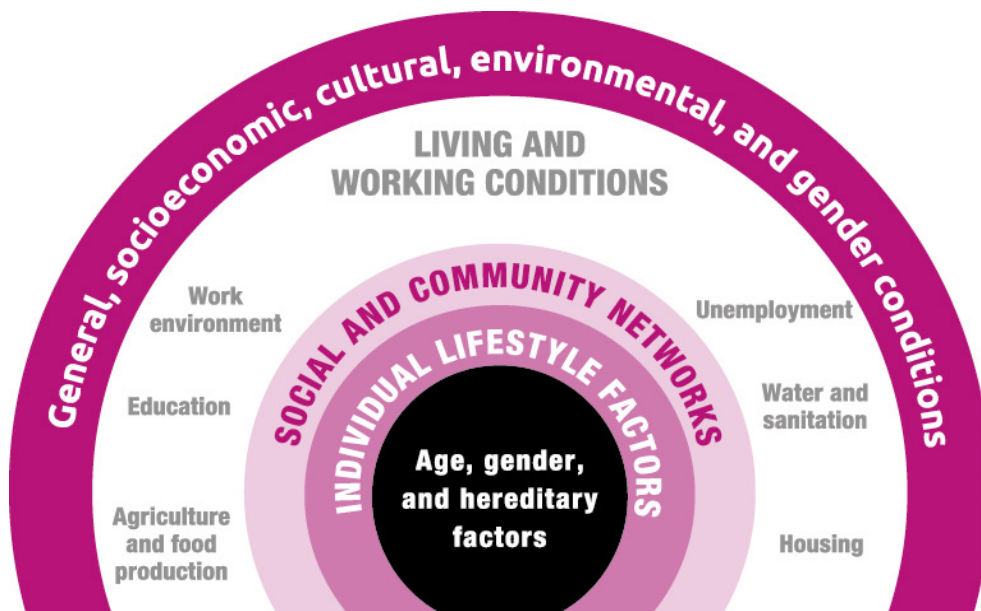
## IS SEX THE SAME AS GENDER?

While sex is a biological construct, gender is a social construct based on sex and relates to the characteristics attributed to women and men, the relationships between them, and the social system that encompasses them. These are distinct terms and not interchangeable, often confused and treated as synonyms. Gender must be considered when trying to understand the differences and similarities between women and men in all aspects of their lives, such as health, especially if these differences create inequalities [1].

## HOW CAN WE INCORPORATE THIS PERSPECTIVE?

Identifying gender biases is one of the most used strategies to incorporate gender perspective and analysis into health care, medical education, and research. The concept of "gender bias in health care" refers to its existence "when, for the same health care need in men and women, greater »





Outline of the health determinants model. Modified from Dalghren and Whitehead, 1991 in Ruiz Cantero 2009.

» diagnostic or therapeutic effort is made for one sex over the other, potentially contributing to health inequalities between men and women" [2]. Evidence has shown that, in 700 studied diseases, there is a greater diagnostic delay in women compared to men; for diabetes, there is a mean delay of 4.5 years in the diagnosis of type 2 diabetes from the onset of symptoms [3]. Moreover, in the case of women's care, complaints or symptoms are more likely to be considered psychosomatic, and women may be medicated with anxiolytics and antidepressants [3]. Further research is needed to identify gender biases in other types of diabetes, although it seems clear that there are aspects that can be addressed as challenges for incorporation into therapeutic education programs.

## ASPECTS THAT SHOULD BE TAKEN INTO CONSIDERATION IN A DIABETES EDUCATION PROGRAM

Therapeutic education programs (TEP) currently implemented in our environment do

not contemplate differential aspects from a gender perspective. However, a good starting point might be to highlight differences based on sex, where physiological aspects have a different impact on achieving glycaemic and quality of life goals.

### *Menstrual cycle*

Women, from menarche (first menstruation), face variability in their glucose levels impacted by the stage of their menstrual cycle. During the luteal phase (after ovulation), especially the days before menstruation, there is a tendency towards hyperglycemia. However, during the follicular phase (from menstruation), there is a tendency towards an increase in hypoglycemic episodes, more pronounced during menstruation. Thus, a high percentage of women require higher insulin needs during the luteal phase and a reduction of these needs during the follicular phase [4]. Menstrual cycle issues should be included in TEPs for girls with diabetes from childhood, before their first menstruation, to reduce anticipatory anxiety and help them understand how their menstrual cycle will influence glucose levels. This topic should be addressed both in adolescence and adulthood. It is necessary to help women identify glucose behavior patterns according to their menstrual »

**GENDER BIAS IN HEALTH CARE REFERS TO ITS EXISTENCE WHEN, FOR THE SAME HEALTH CARE NEED IN MEN AND WOMEN, GREATER DIAGNOSTIC OR THERAPEUTIC EFFORT IS MADE FOR ONE SEX OVER THE OTHER, POTENTIALLY CONTRIBUTING TO HEALTH INEQUALITIES BETWEEN MEN AND WOMEN.**



» cycle and how they can adjust their insulin doses to avoid and/or reduce acute complications. Currently, technology such as continuous glucose monitoring (CGM) and connected pens can assist with this task, allowing review of glucose patterns over different periods and comparison to find treatment patterns. The use of hybrid closed-loop systems has shown good results adapting well to the changing insulin needs associated with the menstrual cycle [5], enabling good glycemic control.

#### **Motherhood**

Motherhood is another aspect that

should be included in TEPs. For adolescents, it is crucial to address the prevention of unwanted pregnancy. Women, whether they wish to become mothers or not, need to understand the necessity of pregnancy planning. Currently, around 50% of women with diabetes do not plan this decision. It is important for diabetic women to understand the risks associated with unplanned pregnancy for the baby and themselves. Therefore, it is advisable to inform them that currently, there are no contraceptives contraindicated for diabetes. Providing contraceptive treatment is considered appropriate.

Care for women with diabetes during pregnancy is generally included in care programs in our environment. When a woman wishes to become a mother, she should communicate this to her diabetes team to be included in a preconception and pregnancy control program to begin planning. This program will include both medical aspects of analysis and treatment adjustments, and educational aspects to provide women with strategies to achieve desired glycemic goals, such as HbA1c values < 6.5%. Control targets are demanding, sometimes causing delays in reaching the ideal situation for pregnancy. Both the preparation process »

» for pregnancy and pregnancy per se require strict controls. Women often make significant efforts to achieve their goal. However, maintaining these optimal control targets can lead to more hypoglycemic episodes, affecting their detection. These factors can have a psychological impact on these women and may require psychological support. One of the most common mistakes in clinical practice is limiting motherhood to the gestation period. It is also important to include in this control women planning adoption and/or fostering, as many women have reported stress during this period and its impact on glucose levels.

Insulin needs drop sharply after childbirth. The postpartum period has been described with an increase in severe hypoglycemic episodes [6]. Newborn care during this period causes stress and irregular schedules and intake for the mother, which can increase the risk of hypoglycemia. This situation can also occur in women who have adopted, as they will also be on constant alert while meeting the baby's needs. Although it is unclear whether there is a relationship between breastfeeding and more hypoglycemia, it is advised to monitor glucose levels to avoid acute complications. In the presence of hypoglycemia, and to prevent them, it is advisable to consume about 10 grams of carbohydrates with glucose levels < 100 mg/dL before breastfeeding. Therefore, postpartum and breastfeeding should be included in TEPs for pregnant women.

#### **Climacteric and menopause**

During this stage, women experience numerous changes, such as sleep disturbances, which impact glucose levels. This change can affect concentration and recent memory, potentially causing doubts about whether the insulin dose has been administered or not. This life stage also increases sexual dysfunction. Hot flashes cause discomfort, stress, worsen sleep disturbances, and can lead to confusion with hypoglycemia signs. Again, using CGM devices with hypoglycemia alert capabilities, connected pens that allow checking insulin administration times and doses, and hybrid closed-loop systems contribute to improving control and quality of life in women with type 1 diabetes. TEPs aimed at women during this life stage should include aspects about the new physiological situation, nutrition, physical activity, and sexual dysfunction. Changes »



## IT IS IMPORTANT TO RAISE AWARENESS AMONG THE SCIENTIFIC COMMUNITY AND HEALTH CARE PROFESSIONALS ABOUT THE IMPORTANCE OF INCORPORATING A GENDER PERSPECTIVE INTO RESEARCH, CLINICAL PRACTICE, AND DIABETES EDUCATION.

» women experience at this age increase the prevalence of depression and anxiety, also in those with diabetes. Attention to mental health and psychosocial care is important even at this age [7].

### *Sexuality*

Sexuality is a rarely addressed field in diabetes consultations, influenced by culture, especially for women. This aspect should be approached similarly to other diabetes management aspects. Sexual dysfunction in people with diabetes is related to suboptimal glycemic control and the duration of diabetes. In women, both the prevention of unwanted pregnancy and sexual dysfunction, particularly during climacteric and menopause, should be included in TEPs. It is advisable to address pelvic floor strengthening and vaginal hydration needs. In men, erectile dysfunction is the most common sexual dysfunction problem. Prevalence has been described as 10% up to 20% higher in diabetic vs non-diabetic men. Erectile dysfunction is associated with neuropathy, dyslipidemia, and cardiovascular problems. It has also been associated with higher levels of depression. Maintaining a healthy lifestyle and avoiding obesity helps improve this dysfunction [8]. Therefore, it is essential to include this topic in TEPs for both prevention and intervention programs to reduce the risk of developing diabetes complications, addressing different treatments that could improve it.

### *Body image*

Body image is a sociocultural aspect to consider and is crucial in adolescence and often in adulthood. The influence of social media and the need to con-

form to peers complicate diabetes management. This aesthetic aspect has a greater impact on women and can also be a barrier to using technologies that help achieve better glycemic control [9]. Eating behavior disorders (EBD) may appear, which, if not detected in time, could lead to eating disorders (ED). In adolescents with diabetes, the presence of EBD and ED is higher than in their peers without diabetes, with a greater prevalence among women in both populations [10]. A study in adolescents with type 1 diabetes aged 11 to 19 years shows 28% of girls and 9% of boys with EBD [11]. In many cases, individuals with EBD use insulin dose reduction and omission as a purgative method; this omission or reduction of insulin doses in adolescents could be a sign of EBD. Therefore, body image is a significant aspect to include in TEPs as a preventive strategy for developing EBD.

### *Physical exercise*

Regular physical exercise has been shown to improve glycemic control and mental health. Studies report poorer exercise management in women due to less training in this aspect [12], particularly among older women. It is necessary to adapt exercise advice to the needs of women in TEPs to facilitate better adherence to this practice.

### *Social aspects and other dimensions of health*

Being a woman with diabetes increases the risk of developing other cardiovascular and genitourinary diseases, depression, anxiety, sleep disorders, and eating disorders [13,14]. Diabetes significantly impacts many other dimensions of phy-

sical and mental health in women from childhood to old age. Social and cultural inequalities, such as the gender economic gap, unpaid work burden, or family caregiving responsibilities, also create barriers to accessing medical care, limit treatment adherence, and hinder lifestyle changes for proper diabetes management [15,16].

### *Some reflections*

We could say that there is a gender bias in diabetes care that needs to be made visible and addressed. Therapeutic education programs in diabetes should include specific aspects from diagnosis, such as the impact of the menstrual cycle on glycemic control, the need for pregnancy planning, and information on how menopause-related changes relate to diabetes. Sexual dysfunction can occur in the entire population with and without diabetes, but with differences between them. Furthermore, the presence of eating behavior disorders has increased in recent years, often accompanied by insulin dose omission. Therefore, early detection is a priority, especially in adolescent women.

It is necessary to raise awareness among the general population and health care professionals to consider these aspects and include them in care and education programs for people with diabetes to ensure they are addressed. It is important to sensitize the scientific community and health professionals about the importance of incorporating gender perspective in research, clinical practice, and diabetes education. We still have much to research and make visible, but we are on the right path. **D**

ASPECT	RELATIONSHIP WITH DIABETES MANAGEMENT
<b>Menstrual cycle</b>	Follicular Phase: Tendency to experience an increase in hypoglycemia episodes, primarily during menstruation. Lower insulin needs. Luteal Phase: Tendency to experience more hyperglycemia. Higher insulin needs.
<b>Maternity</b>	Planning Pregnancy Postpartum stress Postpartum hypoglycemia
<b>Climacteric and menopause</b>	Include aspects related to the new physiological situation, such as diet, physical activity, sexual dysfunction, and sleep hygiene. Increased prevalence of depression and anxiety.
<b>Sexuality</b>	In women: Address the prevention of unintended pregnancy, especially in adolescents, and sexual dysfunction, particularly during climacteric and menopause. In men: Erectile dysfunction is related to neuropathy, dyslipidemia, and cardiovascular problems. It is also associated with a higher prevalence of depression. Maintaining healthy lifestyle habits and avoiding obesity contributes to improvement.
<b>Body image</b>	Address the issue, especially during adolescence. Omission or reduction of insulin doses in adolescents could be a sign of suspected eating disorder.
<b>Physical exercise</b>	There is poorer management of physical exercise in women due to lower training in this area. Personalize and motivate.

**TABLE 1.** Aspects that should be taken into account in a therapeutic education program and their relationship with diabetes management

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