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Social vulnerability in people with diabetes

Type 1 diabetes mellitus (T1DM) is an autoimmune disease that appears in genetically predisposed individuals after possible unknown environmental triggers. Type 2 diabetes mellitus (T2DM) is associated with insulin resistance, obesity, and familial predisposition. People with T1DM are usually diagnosed at an earlier age than people with T2DM and, consequently, the time window

for influencing health outcomes in T1DM is longer. Both types of diabetes are chronic diseases closely related to people's social and living conditions, which may increase the vulnerability of certain population groups. Despite therapeutic and technological advances, important inequalities in metabolic control and in the development of complications persist today and cannot be explained solely by clinical factors.

Health equity is the state in which all people have a fair and **equitable** opportunity to achieve their highest level of health (1). Health **disparities** are preventable differences in the burden of disease and in opportunities to achieve optimal health that are experienced by socially disadvantaged populations (1). The **social determinants of health**, also called social influences on health, are the set of nonmedical conditions in which a person is born, grows, lives, and ages, and which affect their health status and well-being (1). According to the WHO, the sociopolitical context and socioeconomic position constitute structural causes of health inequities, which act through intermediate sets of determinants to generate inequalities in health outcomes.

Among the most important social determinants are socioeconomic status, educational level, place of residence, social support networks, food environment, access to health care services, ethnicity, sex, marital status, and religion (2, 3). All of these are interrelated, and some of them are modifiable, such as educational and economic level. The most relevant social determinants are detailed in **Table 1**.

Social vulnerability results from the accumulation of multiple and different social problems and is a risk factor for a poorer health prognosis. Moreover, when social vulnerability is added to a

chronic disease, the relative risk of mortality is modified to the detriment of the most vulnerable people (2).

The clinical approach to diabetes is based on blood glucose monitoring, diet, physical activity, and therapeutic adherence. **There is evidence of the significant influence of the social determinants of health on the control and prognosis of people with diabetes.** Likewise, it has been shown that people with lower socioeconomic status, lower health literacy, lower social support, or belonging to ethnic minorities have poorer clinical outcomes, a higher risk of complications, and greater use of health care resources (3). Identifying social vulnerabilities by health care professionals is essential to optimally adapt therapeutic interventions.

The most significant social determinants are detailed below.

- **Economic level.** Several studies have shown that people with lower incomes usually have greater difficulty accessing healthy food, maintaining regular physical activity, and complying with therapeutic recommendations. This situation is associated with poorer control of glycated hemoglobin (HbA1c), a higher number of episodes of hypoglycemia and diabetic ketoacidosis, as well as an increased risk of micro- and macrovascular

complications, contributing to greater morbidity and mortality.⁴ These limitations are not solely the result of individual-level decisions, but of structural conditions that prevent appropriate self-care.

Socioeconomic status, which depends on income, educational attainment, and employment activity, has been established as the most influential determinant of diabetes status and outcomes (5). A gradual association has been demonstrated between the prevalence of diabetes and its complications across all levels of socioeconomic status, being more pronounced in the lowest socioeconomic levels (3).

- **Educational level.** This is a factor directly linked to health literacy and the consequent ability to manage the disease autonomously. Low health literacy has been shown to hinder understanding of treatment instructions, interpretation of blood glucose results, and the proper use of self-monitoring devices such as glucometers or continuous monitoring systems (4). A study in Sweden (6) found that a higher educational level was consistently associated with lower HbA1c levels in people with T1DM, which could be explained by the fact that people with a higher educational level may be more aware of ris- »

SOCIOECONOMIC LEVEL	NEIGHBORHOOD	FOOD	HEALTH CARE	SOCIAL ENVIRONMENT	OTHER
✓ Education ✓ Income ✓ Employment activity	✓ Housing ✓ Environment ✓ Transportation ✓ Environmental pollution	✓ Food security ✓ Access to healthy and affordable foods	✓ Access ✓ Quality ✓ Access to technology	✓ Family and/or community support ✓ Social cohesion ✓ Social capital ✓ Religion ✓ Psychosocial stress	✓ Ethnicity ✓ Migration ✓ Marital status ✓ Sex

TABLE 1. Social determinants of health. Own elaboration based on Hill-Briggs F, Adler NE, Berkowitz SA, Chin MH, Gary-Webb TL, Navas-Acien A, Thornton PL, Haire-Joshu D. Social determinants of health and diabetes: a scientific review. *Endocrinology Diabetes Care.* 2021;44(1):258-279.



» ks and secondary prevention measures. Furthermore, a higher educational level among caregivers of children with T1DM was correlated with better glycemic control (7). Furthermore, regardless of the type of diabetes, the prevalence and complications related to diabetes show an inverse relationship with educational level (3). People with basic education or lower had a greater increase in cardiovascular risk (6). For all these reasons, HbA1c levels remain an independent prognostic marker of both short- and long-term complications (5). In addition, it is known that a low educational level increases dependence on the health care system and increases errors in the daily management of diabetes, worsening inequalities in clinical outcomes (4). Diabetes education interventions must be adapted to the patient's level of understanding and needs in order to promote self-care.

- **Employment activity.** A meta-analysis found that unemployment was associated with higher odds of both prediabetes and T2DM (8). In addition, exposure to shift work has been related to a higher risk of diabetes compared with usual daytime schedules.
- **Place of residence, environment, and housing.** This is one of the social determinants that most strongly influences poor DM control, owing to factors such as access to fresh food, education, or urban development with green spaces or facilities for exercise. Greater availability of green spaces has been shown to be associated with a lower prevalence of T2DM and vice versa. This association is greater in areas of low socioeconomic status and in women.⁹ Studies have identified that exposure to environmental chemicals has been associated with a higher risk of diabetes, as well as greater susceptibility to complications in people with diabetes (3).
- **Social support.** Family and community support is consistently associated with better treatment adherence, lower emotional burden, and greater ability to maintain healthy behaviors in the long term (4). Similarly, people with well-established support networks have better blood glucose control, as well as a lower incidence of related depressive »

» symptoms. By contrast, social isolation is related to a higher risk of metabolic decompensation, increased emergency department visits, and poorer perceived quality of life (4).

- **Access to health care services.** Geographic and administrative barriers, particularly in rural or socioeconomically disadvantaged settings, hinder regular follow-up and continuity of care. Lack of access to diabetes education, as well as to periodic check-ups, contributes to suboptimal disease control, a higher rate of complications (5), and greater long-term use of hospital resources (5).

Furthermore, coordination with social services and community resources is essential to address needs that exceed the strictly clinical setting, such as access to healthy food, lack of family support, neighborhood safety, education, or economic difficulties.

- **Access to new technologies.** New technologies for continuous blood glucose monitoring and insulin pumps are methods for improving glycemic control with the active participation of the patient. However, their implementation must be accompanied by ongoing educational strategies delivered by health care professionals with specialized training, with the possibility of resolving doubts, enabling the patient to translate the data obtained into simple concrete actions to achieve optimal glucose control. In the absence of this educational health care support, technology may generate anxiety and confusion. Conversely, limited access to technology among socially vulnerable people with diabetes further restricts the benefits of these devices to privileged populations, widening the gap in diabetes outcomes even further.

In addition, health care professionals play a role in promoting the use of technology but may also limit access to technology if they consider that the patient is not yet ready.

- **Ethnicity.** Latin, Asian American, African American, and Pacific Islander ethnicity is considered a risk factor for developing T2DM. Moreover, social inequalities related to ethnicity are associated with a

higher prevalence of T2DM, perceived discrimination, language barriers, and poorer self-care in lifestyle habits. It has been shown that if the approach to a person with T2DM focuses on their needs and resources, and treatment decisions are made jointly by the physician and the patient, greater patient involvement, greater trust in the health care system, and better outcomes are achieved (2).

Several studies have shown that non-Hispanic Black patients with T1DM had a higher risk of diabetic ketoacidosis compared with non-Hispanic White patients with T1DM (5). In addition, ethnic minorities have been found to be more likely to live near industrial areas, waste facilities, and areas with poor environmental quality, a possible explanation for the increased incidence of T1DM in Black children (5). The evidence highlights that racial inequities exist in diabetes care, raising concern that race-related factors probably affect access to health care, trust in the health care system, and lower recognition of the disease (5).

- **Migration.** The prevalence of T2DM is increasing globally worldwide and is higher among migrants living in developed countries. In addition, there are factors associated with chronic diseases and migration, such as low educational level, poverty, sedentary habits, unhealthy diet, and difficulties in accessing the health care system, which may hinder diabetes management. In the coming years, the migration process toward Europe is expected to increase, which will require adaptation and investment to achieve care centered on these individuals, improving their training in self-care, how to achieve good glycemic control, and how to avoid or delay possible complications, as well as modifying diet and physical activity.

- **Marital status.** A study in Sweden in people with T1DM⁶ found that being married was associated with significantly lower HbA1c levels compared with people who had never married, were divorced, or were widowed. The same study found that never having been married was associated with worse progression of renal glomerular filtration compared with married people (6).

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SOCIOECONOMIC
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- » • **Religion.** Studies conclude that aspects related to religion, consisting of accepting the disease as an act to improve well-being, enhance family and social support, improving the patient's physical and emotional self-care (2). In addition, some religions have a religious community leader with an important role in education. Muslim people with diabetes may be exempt from fasting during Ramadan; however, most wish to fast, making it essential for health care professionals to stratify risk and develop an individualized plan.
- **Female sex.** Men have a higher risk of T2DM at an earlier age and with a lower body mass index compared with women, but women have a significant increase in cardiovascular risk associated with T2DM after menopause (10). In addition, women have higher rates of anxiety and insomnia,

which contributes to psychosocial stress having a greater cardiometabolic impact (2). Regarding clinical trials, women are usually underrepresented.

For all these reasons, screening for the social determinants of health in people with diabetes is essential to identify underlying health risks, implement prevention and early intervention, adapt treatment, and reduce health disparities (5). It is recommended to assess food security, economic resources, housing, caregivers' mental health, transportation, and caregivers' literacy. Any immediate need should be addressed through referrals to community resources or social services, as well as to mental health services when necessary. In addition, it is crucial to provide families with information about available community resources and support services, explaining how social determinants can affect their diabetes and their health. **D**

CONCLUSIONS

The social determinants of health are key factors that contribute to unfair and avoidable differences in health outcomes among different population groups. These influences interact with one another, affect all components of health care, and have a cumulative effect, producing an impact on diabetes.

It is essential for health care professionals to act early and proactively, intensifying education in diabetes management, secondary prevention, and support services, while taking sociodemographic characteristics into account, so that treatment plans are optimally and individually adapted to each patient's needs. In addition, patients with possible risk factors may benefit from closer monitoring, assessing possible changes in these factors.

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