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*Screening, Diagnosis, and Prevention in Clinical Practice:
Evidence from Argentine and Latin American Medicine
(English Version)*

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Associated and clinical factors in patients with diabetes: a narrative review

Factores asociados y clínicos en pacientes con diabetes: una revisión narrativa

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ABSTRAC

Objective: to identify associated factors and clinical factors in patients with diabetes.

Method: Literature review based on a narrative synthesis. Data sources: Scopus, Google Scholar, Pubmed. Data selection: Documents were selected and analyzed based on a critical literature review, taking into account the inclusion and exclusion criteria.

Results: a corpus of 13 articles was analyzed: cross-sectional, retrospective, randomized controlled trial, Mendelian randomization, prospective observational, cohort study, qualitative study, analytical study, and observational cohort study. The population studied in the articles included various categories: adults, women, and minors. The studies were conducted in various countries: China, the United Kingdom, Spain, Norway, Iran, Turkey, Saudi Arabia, and India. Associated factors were self-care, depression, insulin use, obesity, and elevated plasma glucose. Clinical factors were identified as nephropathy, heart failure, postoperative diabetes insipidus, and glycemic control. Regarding socioeconomic status, the studies were conducted in low-income, high-income, and middle-income countries.

Conclusion: diabetes mellitus is a public health problem influenced by associated factors such as lifestyle and social environment, and clinical factors such as hyperglycemia and hypertension. Early diagnosis and self-care are essential to prevent complications.

Keywords: Diabetes; Associated Factors; Clinical Factors.

RESUMEN

Objetivo: identificar los factores asociados y factores clínicos en pacientes con diabetes.

Método: revisión de la literatura basada en una síntesis narrativa. Fuentes de datos: Scopus, Google Académico, Pubmed. Selección de datos: Los documentos fueron seleccionados y analizados bajo una revisión crítica de literatura tomando en cuenta los criterios de inclusión y de exclusión.

Resultados: se analizó un corpus de 13 artículos de estudio trasversal, retrospectivos, ensayo controlado aleatorio, aleatorización mendeliana, observacional prospectivo, estudio de cohorte, estudio cualitativo, estudio de análisis, estudio de cohorte observacional. La población estudiada

en los artículos incluye diversas categorías: adultos, mujeres gestantes y adolescentes menores de edad. Los estudios se realizaron en diversos países: China, Reino Unido, España, Noruega, Irán, Turquía, Arabia Saudita e India. Los factores asociados fueron autocuidado, depresión, uso de insulina, obesidad y glucosa plasmática elevada. Los factores clínicos fueron identificados como nefropatía, insuficiencia cardíaca, diabetes insípida posoperatoria y control glucémico. Respecto al nivel socioeconómico, los estudios se realizaron en países de bajos ingresos, de altos ingresos y otro de mediano ingreso.

Conclusión: la diabetes mellitus es un problema de salud pública influenciado por factores asociados como el estilo de vida y el entorno social, y factores clínicos como la hiperglucemia y la hipertensión. El diagnóstico temprano y el autocuidado son esenciales para prevenir complicaciones.

Palabras clave: Diabetes; Factores Asociados; Factores Clínicos.

INTRODUCTION

Around 374 million people worldwide have prediabetes, and approximately 537 million adults live with diabetes. This disease represents a public health problem that mainly affects people with low and middle incomes (Weisman et al., 2018), generating a considerable economic burden due to the high cost of the medications required for the treatment of chronic diseases (Dall et al., 2010). Given this situation, nursing staff (M. F. Chen et al., 2015) and health programs have focused their efforts on promoting self-care behaviors in people with prediabetes; however, only 27 % of patients adequately follow this process (Barry et al., 2017), mainly due to a lack of motivation, knowledge, and awareness, factors that become critical barriers (Griauzde et al., 2019). In addition, adults with diabetes face difficulties in maintaining self-control of their disease due to individual, psychosocial, and cultural factors and a lack of family support (Whittemore et al., 2019). Added to this are economic constraints that hinder access to medical care, interrupt treatments, and contribute to uncontrolled blood glucose levels (Minhas et al., 2023).

Identifying the factors that contribute to the development and progression of diabetes is essential for preventing, early diagnosing, and effectively controlling the disease. Recognizing both the associated and clinical factors allows for more precise intervention strategies, reduces complications, and improves the quality of life of people at risk.

Cross-sectional quantitative studies have shown that financial costs represent a significant barrier to coping with the disease, both for patients and their families (Mesgie et al., 2025). Similarly, high blood pressure has been recognized as a frequent associated factor, especially in older people with comorbidities and low adherence to medical treatment (Negussie & Abebe, 2025). In terms of clinical factors, narrative studies highlight that diabetic foot ulcers (DFUs) represent a serious and costly complication, the prevalence of which is increasing due to the difficulty in healing chronic wounds (Lázaro-Martínez et al., 2025). In addition, the therapeutic use of renin-angiotensin-aldosterone system (RAAS) blockade is effective in preventing and slowing the progression of diabetic nephropathy, as well as in reducing cardiovascular risk in patients with type 2 diabetes (De et al., 2025).

Therefore, the objective of this study is to conduct a brief narrative review of the associated and clinical factors of diabetes.

METHOD

A comprehensive narrative review was conducted to explore the existing scientific literature on diabetes risk factors, drawing on the following databases: Scopus, PubMed, and Google

Scholar. To refine the search, the following terms were used: (factors for diabetes), (diabetes self-care), (depression), insulin use, obesity, elevated plasma glucose, nephropathy, heart failure, glycemic control, and (postoperative diabetes insipidus). In addition, the Boolean operator AND was used to refine and broaden the search scope, and the search period was extended from March to June 2025, with articles published between 2020 and 2025 considered for review. This search covered texts written in English and Spanish, specifically excluding case reports, interviews, letters to the editor, theses, and books, due to their less empirical nature or specific focus. Within the aforementioned databases, a total of 12,904 articles were initially identified using the designed search string. Of these, 12,904 corresponded to the Scopus database, 2,624 to Google Scholar, and 6,830 to PubMed. Next, 1,020 duplicate articles were eliminated. Subsequently, 12,838 articles that did not align with the study objective and others that did not contribute to the results table and discussion of the work were excluded, as they did not meet the established inclusion criteria. As a result of this filtering and selection process, a final corpus of 14 articles relevant to the review was obtained.

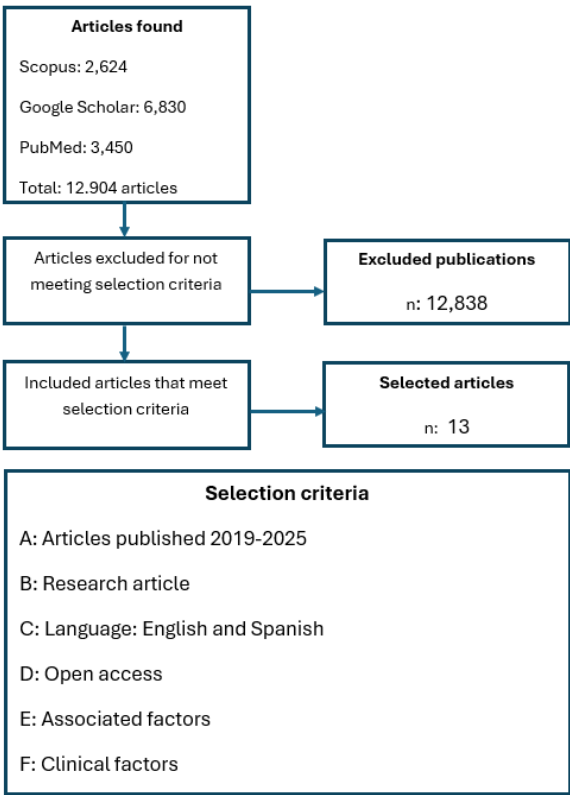


Figure 1. Flow diagram

RESULTS

A corpus of 13 articles was analyzed, including cross-sectional studies, retrospective studies, randomized controlled trials, Mendelian randomization studies, prospective observational studies, cohort studies, qualitative studies, analysis studies, and observational cohort studies. The population studied in the articles includes various categories: 9 articles focused on elderly

adults, 3 on pregnant women, and 1 on adolescents. The studies were conducted in various countries: 4 in China, 2 in Spain, 2 in the United Kingdom, 1 in Iran, as well as Norway, India, Saudi Arabia, and Turkey, each contributing a unique perspective to the research. The clinical condition was characterized by patients who had little family support, were overweight, had hypertension, nephropathy, heart failure, depression, and diabetes at an early age. Regarding socioeconomic status, 3 articles reported low-income populations, and only 11 reported middle-income populations.

Table 1. Results

Study title	Methodology	Objective/Sample	Main results
1. Barriers and facilitators of self-care in adults with pre-diabetes: a directed qualitative content analysis (Jokar et al., 2025)	Qualitative	To investigate the experiences and perceptions of adults with prediabetes and healthcare professionals regarding the disease, and possible intervention strategies for managing prediabetes. Sample 45 participants. 39 adults and 6 healthcare professionals.	The study identified that self-care in people with prediabetes is influenced by personal, social, and structural factors, with barriers such as lack of knowledge and lack of family support, and facilitators such as motivation.
2. A randomized controlled trial to assess if changing sleep timing can improve glucose metabolism in people with prediabetes and type 2 diabetes (Bouman et al., 2024)	Quantitative	To evaluate whether an intervention based on light exposure and changes in sleep habits improves social jet lag and glycemic control in people with prediabetes and type 2 diabetes. Sample: 60 people.	Glycemic control improves by decreasing glycosylated hemoglobin (HbA1c) levels. Jet lag improves insulin sensitivity, medication use, metabolic outcomes, mood, and quality of life.
3. Risk factors for mortality among people with diabetes in Spain: The DIMORTES study (Caride-Miana et al., 2024a)	Quantitative	To analyze all-cause mortality and its associated factors in people with diabetes mellitus (DM) in Spain. Results: 14,784 individuals over the age of 40.	The main comorbidities associated with DM (diabetes mellitus) were overweight, obesity, hypertension, high cholesterol, and osteoarthritis.
4. Diabetes distress and associated psychosocial factors in type 2 diabetes. A population-based cross-sectional study. The HUNT study, Norway (Riise et al., 2025a)	Quantitative	To investigate the prevalence of diabetes distress, its determinants, and its association with anxiety and depression in adults. Sample: 1,954 people over the age of 20.	The factors contributing to developing diabetes at an early age, insulin use, foot ulcers, and symptoms of anxiety and depression.
5. Exploring the interconnectedness of depression, anxiety, diabetes distress, and related psychosocial factors in adults with type 2 diabetes: A network analysis (Zu et al., 2024a)	Quantitative	To investigate the relationship between psychological distress and factors that influence people with diabetes, using a method called “network analysis.” Sample: 481 adults	The factors are: Depression, anxiety, distress due to diabetes, lack of social support, self-efficacy, and interpersonal distress related to diabetes.

6. Investigating whether smoking and alcohol behaviors influence risk of type 2 diabetes using a Mendelian randomization study (Reed et al., 2025)	Quantitative	To determine whether smoking and alcohol are causal factors in the development of type 2 diabetes.	Whether tobacco and alcohol consumption influence the risk of diabetes by affecting fasting blood glucose levels.
7. Evaluation of sociodemographic and nutrition-related factors for type 2 diabetes risk: a sample from Turkey (Karaca-Çelik et al., 2025)	Quantitative	Determine the risk of diabetes in a group of people and its relationship with sociodemographic factors related to nutrition. Sample: 3,990.	The risk of diabetes is higher in women, married individuals, those with low education, increased BMI, and a diagnosis of hypertension. Nutrition-related factors are: Consumption of main meals, energy intake, lipids, and iron.
8. Meta-analysis of risk factors for recurrent gestational diabetes mellitus (Lu et al., 2025a)	Quantitative	To determine the risk factors for recurrent gestational diabetes mellitus (GDM) in women with a history of GDM during a new pregnancy. Sample: 11,385 patients.	The factors are: Advanced maternal age, high BMI, high plasma glucose, previous delivery of a very large macrosomic baby.
9. Social and health service-related factors associated with undiagnosed diabetes mellitus- a population-based survey in a highly urbanized Chinese setting (Poon et al., 2025)	Quantitative Cross-sectional study	To investigate factors associated with type 2 diabetes mellitus (T2DM) in a highly urbanized setting in China. Sample: 2,352 people.	Those living in subsidized housing, economically active, those who did not have regular medical checkups, family burden, and physical activity had a higher risk of UDM (Undiagnosed Diabetes Mellitus).
10. Analysis of factors influencing the occurrence of diabetes insipidus following neuroendoscopic transsphenoidal resection of pituitary adenomas and risk assessment (Li et al., 2024)	Quantitative	Factors influencing the development of postoperative diabetes insipidus. Sample: 281 people.	The factors that cause postoperative diabetes insipidus (excess polyuria and polydipsia) are hypertension, heart disease, preoperative cortisol levels, cerebrospinal fluid extravasation, and tumor texture.
11. Transcriptional dynamics in type 2 diabetes progression is linked with circadian, thermogenic, and cellular stress in human adipose tissue (Rivera-Alvarez et al., 2025)	Quantitative Quantitative	To assess all-cause mortality and its predictive factors by analyzing a large cohort from the Saudi National Diabetes Registry (SNDR). 40,827 individuals.	The presence of macrovascular complications, nephropathy, retinopathy, hypertension, male sex, and advanced age, while morbid obesity and the presence of hyperlipidemia were associated with a lower risk.

12. Assessment of prevalence, risk factors, and psychosocial factors of gestational diabetes mellitus: A prospective observational study (Nelson Kumar et al., 2025)	Quantitative	To determine the prevalence of GDM in pregnant women at a tertiary hospital and identify associated risk factors, including psychosocial stressors. Sample: 280 prenatal mothers.	GDM is associated with clinical factors such as advanced maternal age, pre-pregnancy BMI, obesity, and hypertension.
13. All-cause mortality and risk factors in patients with type 1 diabetes in Castilla-La Mancha, Spain. DIACAM1 2010-2020 study (Putula et al., 2024)	Quantitative	To evaluate mortality and risk factors in a representative cohort of patients with type 1 diabetes mellitus (T1DM). Sample of 1,465 patients.	The causes of death were: retinopathy, creatinine, diabetic renal failure, cardiovascular disease, cerebrovascular disease, heart failure, infectious diseases, tumors, and severe hypoglycemia.

DISCUSSION

The analysis of the selected sources has allowed us to identify important, but not unique, aspects of diabetes, including associated and clinical factors.

Self-care in people with prediabetes is influenced by personal, social, and structural factors (Jokar et al., 2025) such as depression, anxiety, distress due to diabetes, lack of social support, self-efficacy, and interpersonal distress (Zu et al., 2024a), as well as insulin use and foot ulcers (Riise et al., 2025a). The main associated comorbidities are overweight, obesity, hypertension, high cholesterol, and osteoarthritis (Caride-Miana et al., 2024a), while consumption of main meals, energy intake, lipids, iron (Karaca-Çelik et al., 2025), advanced maternal age, high BMI, high plasma glucose, and previous delivery of a very large macrosomic baby (Lu et al., 2025a)

Associated factors

Prediabetes

In people with prediabetes, self-care encompasses personal, social, and structural factors (Jokar et al., 2025). In the case of gestational diabetes (GDM), although it is a temporary condition, it also requires a comprehensive self-care approach that includes healthy eating, physical activity, mental health care, and attention to the social environment (Dang et al., 2025). In addition, improving health literacy strengthens the skills needed for self-care, especially among populations with low levels of education (Butayeva et al., 2023). On the other hand, group diabetes education programs promote autonomy and informed decision-making, which favors better disease management (Riangkam et al., 2024). Improving adherence to self-care practices is crucial for the well-being of adults with type 2 diabetes (T2D). Family support is key to successful self-care management at home. Understanding the specific needs of adults with type 2 diabetes (T2D) and their families enables healthcare professionals to design sustainable, effective family support strategies and interventions (Busebaia et al., 2023).

Depression

Depression as a factor associated with diabetes (Zu et al., 2024b) is a mood disorder that can increase the risk of developing insulin resistance (IR) and type 2 diabetes (Khawagi et al., 2024). This disorder is especially prevalent in older adults with somatic comorbidities (Baudouin et al., 2025). Therefore, it is recommended to implement integrated care models that include both psychological support and medical management (Fanelli et al., 2025). Finally, the prevalence and severity of depression associated with diabetes also vary according to socioeconomic factors

and poor quality of life in rural areas (Liu et al., 2025).

Insulin use

The use of insulin and foot ulcers (Riise et al., 2025b) has been shown to have a significant protective effect against dementia in patients with hypertension and diabetes (Y.-Y. Chen et al., 2025). However, certain practices in insulin management can pose health risks. For example, submerging or storing insulin in water, especially in clay containers, significantly increases the risk of microbial contamination (Kimaro et al., 2025). To improve safety and adherence to treatment, it is recommended to reduce injection frequency and use devices such as insulin pens instead of syringes and vials, which are easier to use and handle (Nkonge et al., 2023). New ways of taking insulin orally (instead of by injection) could help people with diabetes be more consistent with their treatment and improve their quality of life (Low et al., 2025).

Comorbidities

The main associated comorbidities are overweight, obesity, hypertension, high cholesterol, and osteoarthritis (Caride-Miana et al., 2024b). It manifests as dysfunction of the islets of Langerhans, which are groups of cells in the pancreas that produce insulin (Fan & Li, 2025). It also negatively affects the corneal nerve in people with diabetes (Teo et al., 2025). On the other hand, the consumption of ultra-processed foods (UPF) has also been linked to an increased risk of developing diabetes, with obesity being an intermediary factor in this association (Gutierrez-Ortiz et al., 2025). It also contributes to insulin resistance and chronic inflammation (Xiong et al., 2025).

Plasma glucose

Elevated plasma glucose is also an associated factor (Lu et al., 2025b) in diseases characterized by endothelial damage and neovascularization, with increases in endocan levels, the plasma atherogenic index (PAI), and insulin resistance (Ljuca et al., 2025). However, there are few large-scale cohort studies analyzing the relationship between AIP and the risk of developing type 2 diabetes (Zhou et al., 2025). Some studies suggest that 1-hour post-load blood glucose during the oral glucose tolerance test (OGTT) could be a useful early marker for predicting this risk (Yang et al., 2025). Moreover, it has been found that plasminogen activator inhibitor type 1 (PAI-1) may rise before plasma glucose levels in individuals with normal blood glucose levels (Hernestål-Boman et al., 2025).

Clinical factors

Clinical factors that increase mortality in patients with diabetes are the presence of macrovascular complications, nephropathy, retinopathy, hypertension, male sex, and advanced age, while morbid obesity and the presence of hyperlipidemia (Rivera-Alvarez et al., 2025), as well as cerebrovascular diseases, heart failure, infectious diseases, tumors, and severe hypoglycemia (Pinés Corrales et al., 2024) are also contributing factors. Postoperative diabetes insipidus (excess polyuria and polydipsia) is associated with hypertension, heart disease, preoperative cortisol levels, cerebrospinal fluid extravasation, and tumor texture (Li et al., 2024). However, glycemic control improves glycated hemoglobin (HbA1c) levels, insulin sensitivity, medication use, metabolism, mood, and quality of life (Bouman et al., 2024).

Nephrological complications

Factors that increase mortality in patients with diabetes are the presence of macrovascular complications and nephropathy (Rivera-Alvarez et al., 2025). Chronic hyperglycemia and high blood pressure are considered the main risk factors for the development of diabetic nephropathy

(DN), despite strict control of fasting plasma glucose (FPG) (Samsu, 2021). Microalbuminuria, defined as the presence of small amounts of albumin in the urine, is recognized as an early marker of this complication (Khathi et al., n.d.). In addition, the biomarker glycated hemoglobin (HbA1c) enables detection of conditions associated with nephropathy risk (Rivadeneira Arévalo et al., 2025). On the other hand, regular use of glucosamine supplements has been associated with a lower risk of microvascular complications, including diabetic nephropathy (Cheng et al., 2025).

Heart failure

As in cerebrovascular diseases, significant metabolic alterations are observed in patients with heart failure (Pinés Corrales et al., 2024). In heart failure with preserved ejection fraction (HFpEF), impaired glucose metabolism, insulin resistance, and albuminuria, defined as the presence of albumin in the urine, are common (Vranken et al., 2025). The TyG index, a marker of insulin resistance and albuminuria, is defined as the presence of albumin in the urine (Vranken et al., 2025). The TyG index, a marker of insulin resistance, has been associated with an increased risk of cardiovascular disease in people with type 2 diabetes (Oh et al., 2025). In this context, treatment with empagliflozin has been shown to improve functional capacity and key heart functions in patients with preserved ejection fraction (HFpEF) and type 2 diabetes, such as left ventricular filling pressure, as well as diastolic, left atrial, and chronotropic reserves (Ovchinnikov, n.d.). Likewise, other vital medications used in the management of HF, such as sacubitril, valsartan, and sodium-glucose cotransporter 2 (SGLT-2) inhibitors, have a favorable metabolic profile and reduce the incidence of cardiogenic diabetes (Triposkiadis et al., 2021).

Postoperative diabetes insipidus

Postoperative diabetes insipidus (excessive polyuria and polydipsia) is caused by hypertension (Li et al., 2024). AVP deficiency causes an inability to concentrate urine and excessive renal water loss, resulting in a clinical syndrome of hypotonic polyuria with compensatory thirst (Tomkins et al., 2022). Central diabetes insipidus (DI) is caused by a deficiency of the hormone arginine vasopressin (AVP) in the pituitary gland or hypothalamus. In contrast, nephrogenic DI is caused by AVP resistance in the kidneys (Crain et al., 2019). gestational diabetes insipidus, which results from increased placental vasopressinase; and, finally, primary polydipsia, which involves excessive intake of large amounts of water despite normal AVP secretion and action (Christ-Crain et al., 2021). The most common treatment for chronic diabetes insipidus (CDI) and gestational diabetes is the administration of synthetic ADH, desmopressin (DDAVP) (Mutter et al., 2021).

Glycemic control

Glycemic control improves glycated hemoglobin (HbA1c) levels, insulin sensitivity, medication use, metabolism, mood, and quality of life (Bouman et al., 2024). However, despite these benefits, studies show that many people with type 2 diabetes have poor control (Tarekegn et al., 2025). Diabetes education is key to improving glycemic control, self-efficacy, and quality of life (Bilgehan & Vardar İnkaya, 2025). However, poor control can increase diabetic distress and fear of hypoglycemia (Vasco et al., 2025). Given this situation, it is necessary to implement educational interventions that strengthen self-care and directly improve glycemic control (Jackson et al., 2025).

Limitations

This research study has some limitations, as it has not been possible to cover the extensive literature on the subject. As a result, only a few factors have been developed to assess the

impact of self-care on glycemic control.

Covering the extensive literature on the subject, and, as a result, only associated factors and clinical factors have been developed. In addition, the studies reported in the discussion are specific in terms of population and methodology, which in this study could only be generalized. The following recommendation is proposed to expand the source analysis to migrate to a systematic review.

CONCLUSION

The absence of self-care in people with prediabetes contributes to the development of type 2 diabetes due to personal, social, and structural factors. In the case of gestational diabetes, a healthy lifestyle, mental health, and a supportive social environment are recommended, with self-care skills promoted through educational programs that support disease management. Depression is a risk factor for developing insulin resistance, making psychological support necessary, especially in people with poor quality of life in rural areas. The use of insulin can prevent dementia in people with hypertension and diabetes, but its misuse can have adverse consequences. In addition, elevated plasma glucose is associated with vascular damage and insulin resistance. Markers such as AIP, endocan, and PAI-1 enable early detection of type 2 diabetes risk, even before glucose levels are altered, underscoring the importance of early diagnosis and self-care to prevent complications.

Diabetes mellitus is associated with multiple complications, including diabetic nephropathy, heart failure, and, in some cases, postoperative diabetes insipidus. Factors such as chronic hyperglycemia, high blood pressure, and insulin resistance play a decisive role in its progression. Microalbuminuria and glycated hemoglobin (HbA1c) are key markers in the early detection of renal and metabolic damage. Likewise, drugs such as empagliflozin and desmopressin have shown efficacy in the management of cardiovascular complications and diabetes insipidus, respectively. However, glycemic control remains a challenge in a large proportion of patients, increasing the risk of deterioration. In this context, diabetes education is essential to strengthen self-care, improve metabolic control, and prevent long-term complications.

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