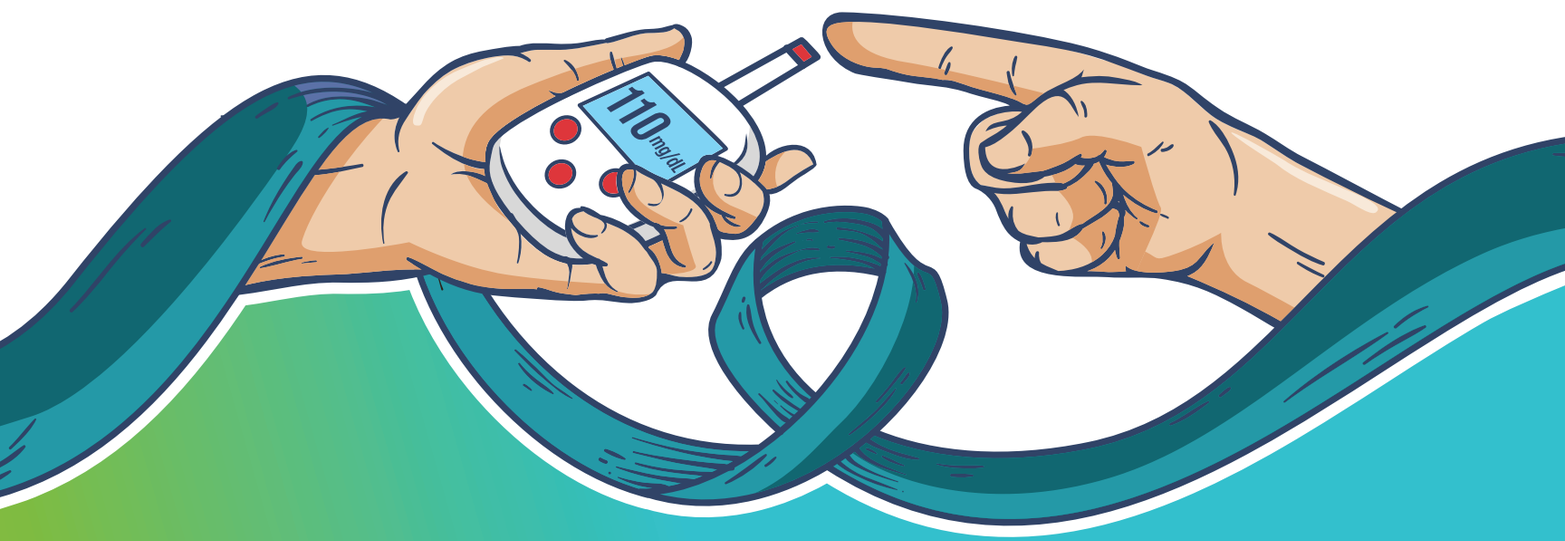
Roche

Frontiers in DIABETES

Volume 5 | Issue 4

CONTENT



14th November

WORLD DIABETES DAY

InTouch

Monitoring what matters to people with diabetes

Reference: Porth Ak et al. Monitoring what matters to people with diabetes: Do we underestimate the importance of behavior, attitude, and well-being? Patient Educ Couns. 2024 Nov:128:108377.

Introduction:

Despite major advances in diabetes monitoring and treatment evidence suggests that currently more than half of people with type 2 diabetes (T2D) and up to over 90 % of people with type 1 diabetes (T1D, 41–92 % depending on age and geographic location) do not achieve their HbA1c targets.

The practical application of person-centred approaches that include mental well-being (addressing diabetes distress, depression, and anxiety), health and self-management behaviours (such as medication adherence and sleep patterns), medication tolerability, and social determinants of health in routine diabetes care is still in the early stages.

Study Objective	To identify important patient-related outcomes for people with diabetes and compare them with the perspectives of healthcare providers.
Study Population	N= 105 participants, including 60 people with diabetes and 45 healthcare professionals, from 13 countries*
Study Method	Delphi gathered input from people with diabetes and healthcare professionals, comparing their perspectives on important person-reported outcomes (PROs) for routine diabetes management.

* Austria, Belgium, Denmark, France, Germany, Italy, the Netherlands, Norway, Romania, Spain, Sweden, Switzerland, and the United Kingdom

Results:

- Outcomes related to self-management behaviours, particularly underlying attitudes, and motivation, as well as outcomes relating to subjective health status, diabetes symptoms, and sleep may currently not be adequately incorporated into clinical diabetes management.
- People with diabetes consider it important to regularly review and document these aspects and use them for diabetes care, while health professionals do not (Table 1).
- Successfully implementing self-management behaviours is linked to improved blood sugar levels. Motivation is very crucial for successfully implementing self-management.

Well-being

- People living with diabetes may be aware of the impact their sleep has on their well-being and wish to incorporate sleep data into diabetes monitoring.
- Regular and standardised documentation of side effects and other diabetes symptoms would extend the assessment of treatment effects beyond clinical trials with implications for future diabetes research and policymaking.

	Patient votes	HCP votes	Diffrence
Outcome	**≥7**	**≥7**	**(p.p.)**
Health status	82%	62%	19.44%
Diabetes symptoms	88%	56%	32.78%
Self-management behaviour performance	83%	67%	16.67%
Self-management capacity	82%	60%	21.67%
Perceived importance of self-management behaviours	85%	42%	42.78%
Motivation in self-management	82%	56%	26.11%
Perceived control over diabetes	78%	62%	16.11%
Side effects	70%	53%	16.67%
Sleep quality	77%	38%	38.89%
Lifestyle behaviours	73%	56%	17.78%
Eye and foot screening documentation	80%	51%	28.89%

Table 1 : Outcomes that people with diabetes considered important for regular monitoring in diabetes management but healthcare providers did not. Adapted from: Porth Ak et al.

➤ Steps that may help to integrate the patient-reported outcomes as important for people with diabetes into everyday clinical practice with little effort and minimal change in routine.

When?	What?
At the beginning of the consultation	Ask the patient how they are doing, specifically inquiring about motivation, their current ability to self-manage, perceived symptoms, and sleep.
At the end of the consultation / when making treatment decisions	Check medication tolerance and ascertain whether appointments for foot and eye examinations have been scheduled or when they were last carried out.
When people report symptoms or sleep problems	Advise them to document both along with their blood glucose levels until their next appointment. This may simply be recorded within their blood glucose diary, in symptom and health monitoring apps, including menstrual cycle tracking apps, or in specific diabetes apps for which evidence suggests that their use can help lower HbA1c.
Always	Record this information in a structured way to better trace individual progress.

Prioritising these person-reported outcomes can facilitate the implementation of more person-centered diabetes monitoring which may support better-informed treatment decisions to achieve treatment goals.

Legacy effect of intensive glyceamic control in type 2 diabetes

Reference: Adler AI et al. Post-trial monitoring of a randomized controlled trial of intensive glyceamic control in type 2 diabetes extended from 10 years to 24 years (UKPDS 91). Lancet 2024; 404: 145–55

Introduction:

The UKPDS study, spanning for 20 years, showed that intensive glycaemic control in newly diagnosed type 2 diabetes patients using sulfonylurea, insulin, or metformin significantly reduced the risk of diabetes-related complications, especially microvascular issues. Overweight participants using metformin also saw reduced risks of all-cause mortality and heart attacks. A follow up study conducted for 10 yrs post-trial highlighted enduring "legacy effects" where early intensive treatment benefits persisted long-term, even as blood sugar levels between intensive and conventional groups later became similar.

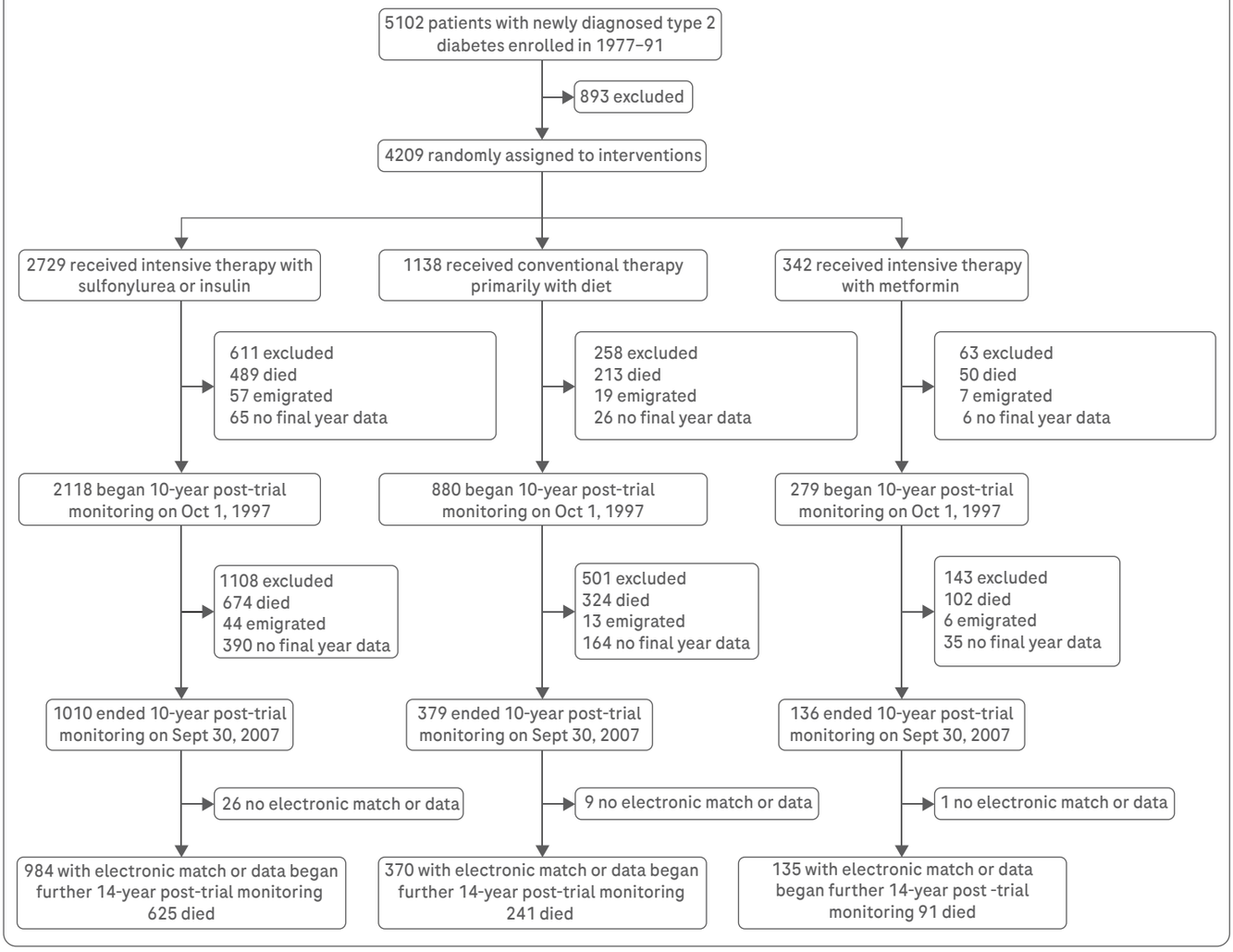
Study Objective

To determine whether these effects would wane by extending follow-up for another 14 years.

Study Outcomes

Diabetes-related endpoint, diabetes-related death, death from any cause, myocardial infarction, stroke, peripheral vascular disease, and microvascular disease.

Trial profile



- The UKPDS study has demonstrated that maintaining near-normal blood sugar levels from the time of diagnosis of type 2 diabetes can minimise the risk of complications and prolong life.
- Early metformin therapy has been shown to reduce the risk of complications and mortality.
- The legacy effects of metformin observed during the post-trial monitoring study in the metformin group, compared to the conventional therapy group, remained significant over the following 14 years.
- The significant effect of metformin over the long term suggests that there may be additional protective mechanisms associated with metformin, such as the inhibition of inflammatory pathways.

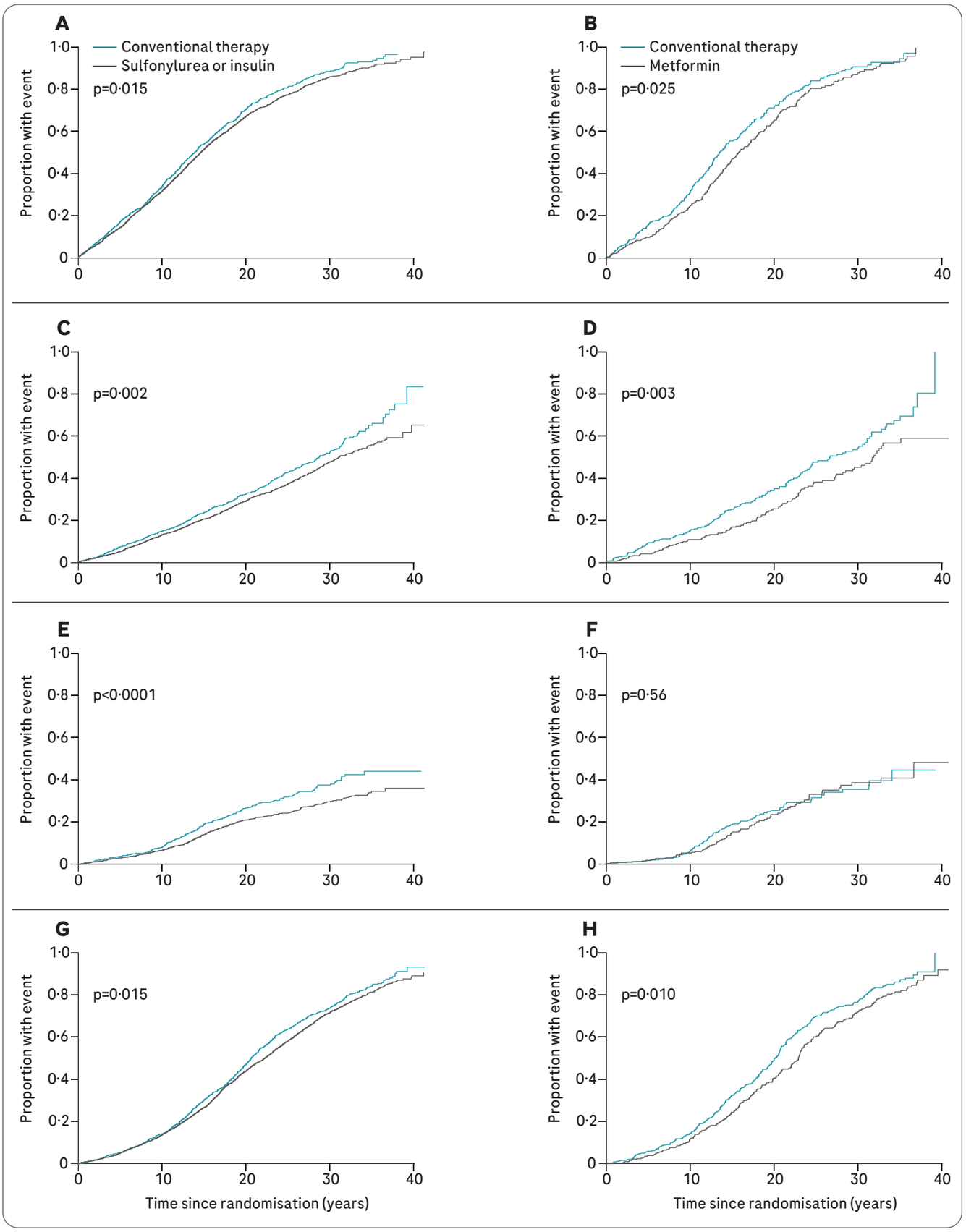


Figure 1: Kaplan–Meier curves for four prespecified aggregate clinical outcomes

Diabetes-related endpoint (A–B), myocardial infarction (C–D), microvascular disease (E–F), or who died from any cause (G–H)
Adapted from: Adler AI et al.

- The study supports the significant role of glucagon-like peptide-1 (GLP-1) receptor agonists and sodium-glucose cotransporter-2 (SGLT2) inhibitors in reducing the risk of diabetes complications.
- The long-term health benefits shown in the study suggest that these therapies may have a strong economic case for use in low-income settings, as they provide enduring health benefits beyond the trial period.

Achieving near-normal glycaemia immediately after type 2 diabetes is diagnosed appears to be essential to minimise the lifetime risk of diabetes-related complications to the greatest extent possible.

Bridge to Excellence

Reference: Diabetes Care 2024;47(Supplement_1):S219–S230

Q 1. What is a primary goal of nutrition therapy for adults with diabetes?

A. To focus on eating only specific macronutrients and micronutrients.

B. To improve overall health and achieve individualized glyceamic, blood pressure, and lipid goals.

C. To emphasise eating the same foods regardless of personal preferences.

D. To eliminate all the pleasure associated with eating.

Q 2. Diabetes self-management education and support (DSMES) is associated with

A. An improved diabetes knowledge and self-care behaviours

B. Lower A1C

C. Lower self-reported weight and improved quality of life

D. Reduced all-cause mortality risk

E. Positive coping behaviours and lower health-care costs

F. All the above

Q 3. According to ADA 2024 guidelines, how often should youth with type 2 diabetes engage in vigorous muscle-strengthening activities?

A. 2 times a week

B. Only once a week

C. At least 3 days a week

D. Every day

Spotlight

Time in range: self-monitoring of blood glucose vs. continuous glucose monitoring

Reference: Cao W et al. A comparative study of the relationship between time in range assessed by self-monitoring of blood glucose and continuous glucose monitoring with microalbuminuria outcome, HOMA-IR and HOMA-β test. Journal of Diabetes and Its Complications. 2024; 38 (2024):108831.

Introduction:

Important monitoring methods in glyceamic management

- Self-monitoring of blood glucose (SMBG)
- Continuous glucose monitoring (CGM)

Study Objective

To compare the time in range (TIR) obtained from SMBG with that obtained from CGM, and explore the relationship of TIR with microalbuminuria outcome, HOMA-IR and HOMA-β test.

Study Population

N= 400 patients with type 2 diabetes

Results:

- No significant difference between the two groups in TIR, Time Above Range (TAR), and the time percentage of blood glucose ≥250 mg/dl.
- The hypoglyceamic assessment metrics time below range (TBR) and the time percentage of blood glucose ≤54.0 mg/dl calculated by CGM were significantly higher than those by SMBG (P <0.001, P = 0.033).
- The glyceamic variability parameters standard deviation and coefficient of variation from CGM are dramatically lower while mean amplitude of glucose excursions is remarkably higher than those calculated from SMBG (all p < 0.05).

	SMBG	CGM	Z	P value
TIR (%)	70.83 (46.88, 87.50)	74.94 (44.90, 88.04)	-0.691	0.489
TBR (%)	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	-4.381	<0.001***
≤54 mg/dL	0.00 (0.00, 0.00)	0.00 (0.00, 0.00)	-2.126	0.033*
TAR (%)	29.17 (12.50, 50.00)	25.06 (11.44, 55.10)	-0.768	0.443
≥250 mg/dL	0.00 (0.00, 150)	8.2 (0.00, 121)	-0.575	0.565
SD (mmol/L)	2.07 (1.64, 2.54)	1.83 (1.43, 2.26)	-5.446	<0.001***
CV (%)	22.32 (19.16, 26.87)	19.98 (16.34, 24.56)	-5.568	<0.001***
MAGE (mmol/ L)	3.72 (2.96, 4.57)	4.26 (3.51, 5.20)	-5.993	<0.001***
M-Value (mmol/ L)	5.86 (2.70, 11.61)	4.59 (2.32, 10.68)	-2.604	0.009**

Table 2: Comparison of the SMBG or CGM metrics

* P<0.05.; ** P<0.01.; *** P<0.001.

- For every 1 % increase in TIR_{CGM}, the risk of microalbuminuria decreased by 1.6 % (95%CI:0.973, 0.995, p = 0.006) and for every 1 % increase in TIR_{SMBG}, the risk of microalbuminuria decreased by 1.3 % (p = 0.033).

The TIR calculated by SMBG was highly consistent with that reported by CGM and was significantly associated with the risk of microalbuminuria and the HOMA-β.

Higher TIR quartiles were associated with lower incidence of microalbuminuria as well as higher levels of HOMA-β.

Diabetes Connect

The interrelationship between diabetes mellitus and emotional well-being

Reference: Mangoulia P et al. The Interrelationship between Diabetes Mellitus and Emotional Well-Being: Current Concepts and Future Prospects. Prospects. Healthcare 2024, 12, 1457.

Introduction:

- Psychological stress has been increasingly identified as a risk factor for the onset and progression of diabetes mellitus.

Diabetes Mellitus and Mental Health

- The diabetes and mental health have a bidirectional relationship.
- Diabetes and mental/psychological distress can limit the physical and emotional well-being of affected individuals, creating a self-perpetuating cycle of interaction, as shown in Figure 2.
- Factors such as genetics, intrauterine life, social determinants, and medication may also contribute to this interaction.

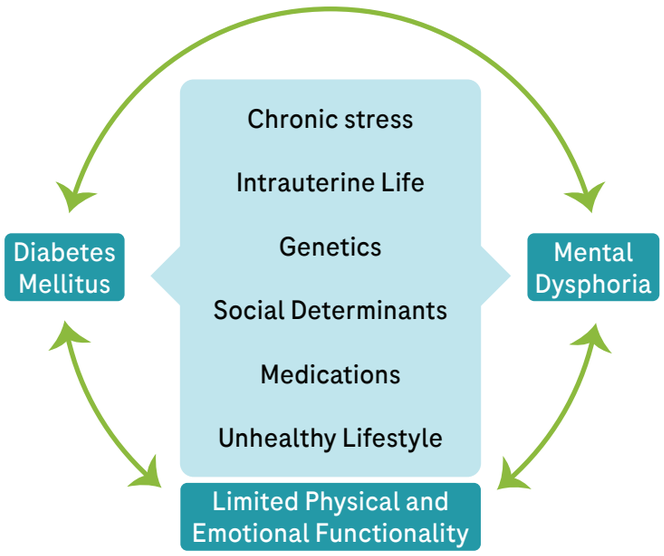


Figure 2: Diabetes and mental/psychological dysphoria can lead to restrictions in the physical and emotional functionality of those who suffer, forming a self-feeding cycle of interaction

Adapted from: Mangoulia P et al.

- Extended activation of stress mechanisms can have serious detrimental effects on the body.
- Both physical and psychological stress are believed to impact the development of diabetes through behavioural and physiological pathways.
- Prolonged periods of stress can trigger or worsen inflammation, which in turn may influence the development of diabetes mellitus by affecting inflammatory cytokines.

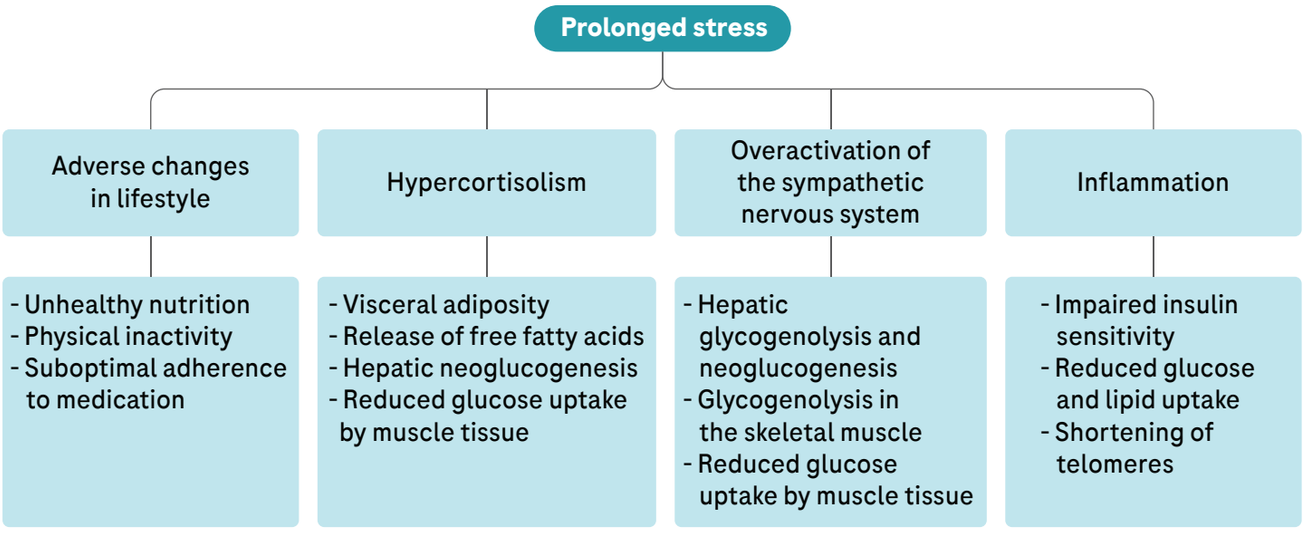


Figure 3. The effect of stress-related physiological mechanisms on glycaemia

Adapted from: Mangoulia P et al.

Diabetes Mellitus and Mental Health

- Diabetes is a chronic disease that places high demands on patients.
- In addition to its adverse metabolic consequences, it is associated with serious emotional challenges.
- The lives of individuals with diabetes are filled with uncertainties and repeated medical, psychological, and social hardships.
- Some of these patients may experience "diabetes distress," which can be expressed through a series of problematic attitudes and behaviours.
- The management of diabetes should not only focus on glyceamic control and the prevention of medical complications but also on relieving the psychological burden.
- Therefore, psychosocial treatment should be integrated into clinical care and provided to all people with diabetes, with the aim of achieving the highest attainable health outcome and emotional well-being.

Diabetes and Common Psychiatric Disorders

- Diabetes mellitus and psychiatric disorders have a complex relationship, with both influencing each other in multiple ways.

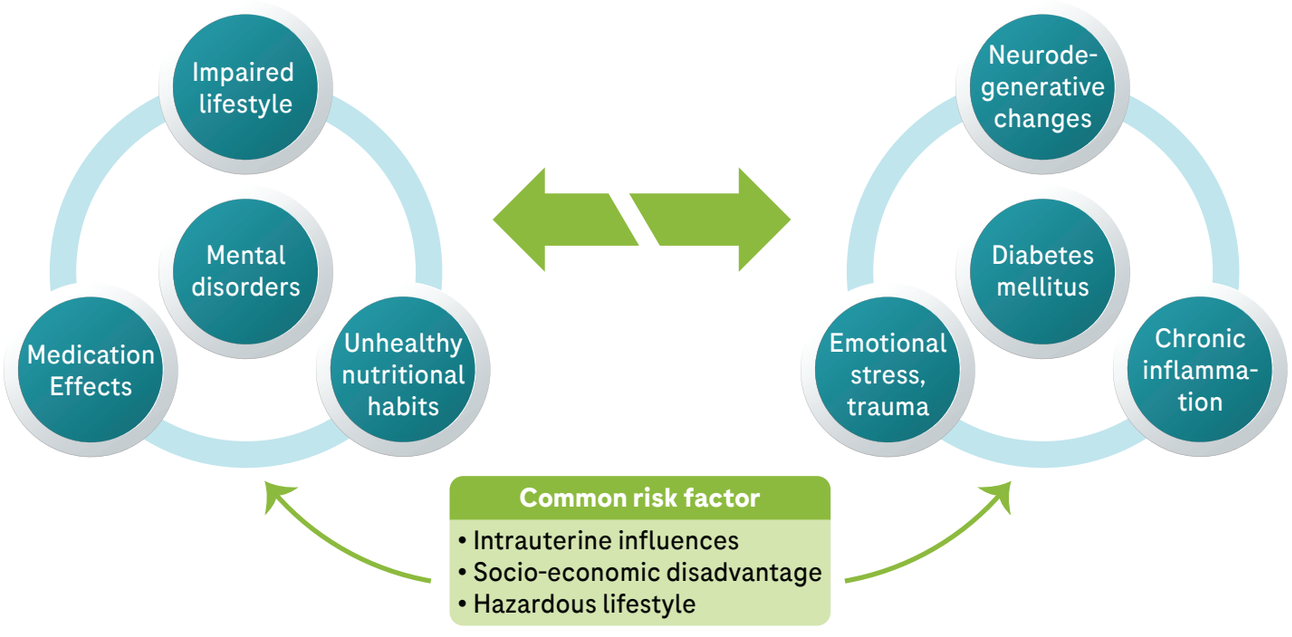


Figure 4. Pathways of interaction between diabetes mellitus and mental disorders
Adapted from: Mangoulia P et al.

Psychiatric comorbidities among patients with diabetes

- Individuals with diabetes are more likely to experience mental health disorders compared to those without diabetes.
- Unfortunately, these mental health issues can make it harder to manage blood glucose levels, leading to a higher risk of diabetic complications and a lower quality of life.
- It's important from both medical and social standpoint to prioritise the identification of psychiatric comorbidities in diabetes patients, as these conditions can increase illness and death rates while decreasing overall quality of life.

Depression | Anxiety | Eating disorders | Schizophrenia

- **Depression** occurs one and a half to two times more often in individuals with diabetes compared to the general population. Having both conditions at the same time is associated with increased chances of diabetic complications, functional disability, and decreased life expectancy.
- The prevalence of clinical **anxiety** among individuals with diabetes is concerning, reaching 14%, compared to around 4% in the general population. The connection between anxiety and diabetes is not entirely understood, but it is likely attributed to a synergistic interaction in behaviour.
- **Disturbed eating behaviour** in individuals with diabetes is a major concern because it can disrupt a patient's ability to adhere to daily self-care tasks and lead to high blood sugar levels.

- Diabetes mellitus commonly occurs alongside **schizophrenia.** The typical risk factors for type 2 diabetes, such as poor diet, lack of physical activity, and obesity, are prevalent among individuals with schizophrenia, even in the early stages of the illness. People with schizophrenia often have a low socio-economic status, which restricts their ability to maintain healthy lifestyles.

- The management of diabetes mellitus in modern clinical practice should not only focus on treating high blood sugar levels.

- It's essential to provide mental health support as a part of care for people with diabetes to address any emotional impairments and psychological distress they may experience.

- These interventions are expected to have positive effects on self-management, complication prevention, and life expectancy.

- A holistic approach to diabetes care considers a patient's emotional needs and social circumstances, in addition to selecting the appropriate anti-diabetic medication.

Psychosocial support

Guidance on self-Care

- Educates on blood glucose monitoring, diet, physical activity, and treatment adherence
- Provides individualised instructions to enhance self-care and emotional adjustment

Cognitive behavioural therapy

- Reorganises dysfunctional thoughts and changes behaviours
- Focuses on optimism and resilience
- Improves self-care, mood, and quality of life

Social supportive networks

- Offers emotional, material, and practical support
- Formal (insurance, social services) and informal (family, friends) networks improve outcomes, especially for the vulnerable

Psychopharmacological agents

- Antidepressants
- Antipsychotics
- Anxiolytics

Psychopharmacological agents

- Holistic care includes emotional needs and social circumstances
- Diabetes specialists should recognise and manage psychological issues, with psychiatric referrals when necessary
- Address both physical and mental health in diabetes management
- Psychoeducation: disease information, acquirement of problem-solving and communication skills, increase in self-confidence
- Education should help patients accept and manage their condition

- **When treating psychological issues and psychiatric disorders, a comprehensive biopsychosocial approach should be taken, and where appropriate, psychopharmacological therapies or psychotherapy should be applied.**

- **The goal of continuous education and assistance for self-care is to give individuals with the disease the information and abilities they need to control their condition over time.**

Diabetes in Control

Intervention for managing blood sugar levels and enhancing physical function in older adults with type 2 diabetes mellitus

Yu QY et al. Which intervention is optimal to control blood glucose and improve physical performance in the elderly living with type 2 diabetes mellitus? A network meta-analysis. Asia Pac J Clin Nutr 2024;33(3):319-347.

Introduction:

- Type 2 diabetes mellitus (T2DM) significantly impacts the health of the elderly, increasing the risk of impaired physical function, fatal falls, and reduced quality of life.
- Medications, as well as lifestyle changes such as diet and exercise, are the main ways to treat T2DM in older adults.
- It is recommended to improve muscle mass, muscle strength, and physical performance in elderly people with T2DM through high-energy diet, resistance exercise, individualised health management, psychological training, and combined interventions.
- Several randomised controlled trials were conducted to find the optimal intervention for achieving glyceamic control and improving physical performance, but the conclusions were inconsistent.

Study Objective	To assess the comparative efficacy of different interventions on blood glucose control, muscle mass, muscle strength, and dynamic balance in older adults with T2DM
Study Population	n=346 Physical activity, n=178 Physical activity + Nutrition supplementation, n=109 Physical activity + Psycho-social or Cognitive training, n=75 Nutrition supplementation, n=72 Physical activity + Pharmacotherapy, n=70 Health management, n=68 Mixed physical activity, n=64 Pharmacotherapy and n= 907 Control group (no intervention)
Study Outcomes	Glyceamic indicators: HbA1c and fasting plasma glucose (FBG)

Study Method:

Patient were treated with any medication to decrease blood glucose such as metformin, empagliflozin, linagliptin, dapagliflozin, insulin, etc.

Health management: Health care providers (such as nurse, doctors, etc) provide individualised nursing and lifestyle treatments, including weight management program or nutritional recommendation.

Physical activity only: Any type of aerobic exercise, resistance exercise, and balance exercise.

Mixed physical activity: Any two or more forms of structured exercise including aerobic, resistance, flexibility, or balance exercise.

Nutrition supplementation only: This includes any nutritional supplementation (such as calcium/vitamin D, protein, etc.).

Physical + psychosocial or cognitive training: Any form of exercise with any form of psycho-social or cognitive training.

Physical + pharmacotherapy: Any form of exercise with pharmacotherapy.

Physical + nutrition supplementation: Any form of exercise with nutritional supplementation (such as calcium/vitamin D, protein, etc.).

Physical + health management: Any form of exercise with health management provided by health care providers (such as nurses, doctors, etc) with individualised nursing and lifestyle treatments, including weight management programs or nutritional recommendations.

Placebo or standard care: Usual /routine health care, no treatment, placebo.

Results:

- Interventions that included physical activity combined with nutritional supplements and health management were more effective in decreasing HbA1c than the control group.
- Health management was superior to nutrition supplementation-only interventions.
- The physical activity-only intervention was found to be significantly more effective in reducing FBG than the control group.
- The combination of physical activity and psycho-social or cognitive training intervention had the highest probability of increasing muscle mass.
- The physical activity intervention was found to significantly increase grip strength when compared with the control group.
- The combination of physical activity and psycho-social or cognitive training intervention appeared as the best intervention to increase gait speed.
- The study suggests that older adults with T2DM who expect to see a decline in HbA1c levels should engage in individualised health management provided and supervised by health providers.
- Physical activity, combined with or without nutritional supplements, is more beneficial for improving muscle mass and strength compared to medication management, pharmacotherapy, psychosocial cognitive training, and nutrition supplements alone in managing sarcopenia or frailty.
- Older adults with T2DM who receive supervised and personalised health management are advised to reinforce exercise intensity and nutritional supplements to avoid injury from falls and muscle aches due to muscle weakness.
- Individualised health management should be combined with simultaneous exercise and cognitive training to optimize effectiveness for both controlling blood glucose and improving physical function.

- **The intervention of physical activity combined with psycho-social or cognitive training appeared as the best intervention to increase lower muscle strength and improve dynamic balance.**
- **Individualised health management combined with physical and cognitive training is the optimal intervention to achieve glyceamic control and improve physical function in older adults.**

Bridge to Excellence

Answers

1. **B. To improve overall health and achieve individualised glyceamic, blood pressure, and lipid goals.**
Nutrition therapy for adults with diabetes aims to promote healthful eating patterns that improve health and support individualised glyceamic, blood pressure, and lipid targets, rather than focusing solely on specific nutrients.

2. **F. All the above**
DSMES is associated with improved diabetes knowledge and self-care behaviours, lower A1C, lower self-reported weight, improved quality of life, reduced all-cause mortality risk, positive coping behaviours, and lower healthcare costs.

3.**C. At least 3 days a week**
The ADA 2024 recommends that youth with T2DM should perform vigorous muscle-strengthening activities at least 3 days per week.

Abbreviations: HbA1c, Hemoglobin A1c; UKPDS, UK Prospective Diabetes Study; SMBG, Self-monitoring of blood glucose; CGM, Continuous glucose monitoring; TIR, the time in range ; HOMA-IR, The homeostasis model assessment of insulin resistance; HOMA-β, The Homeostatic Model Assessment of Beta Cell Function; TAR, Time Above Range; TBR, Time below Range; SD: Standard deviation; CV: glucose coefficient of variation; MAGE: Mean amplitude of glucose excursions; RCTs, randomized controlled trials; T2DM, type 2 diabetes; FBG, fasting plasma glucose; DSMES, diabetes self-management education and support.

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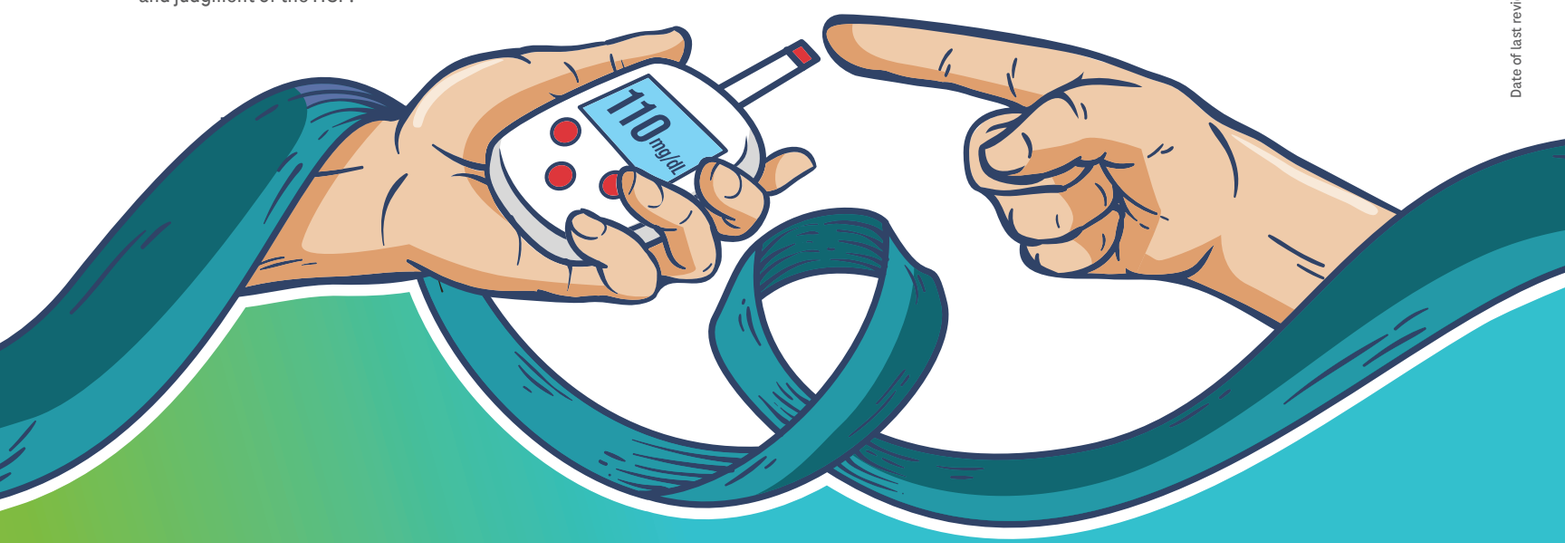

— 14th November —

WORLD DIABETES DAY