

Diabetes

Current Awareness Bulletin

October 2024

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Articles

Could Online Education Replace Face-to-Face Education in Diabetes? A Systematic Review

Alonso-Carril N, Rodriguez-Rodríguez S, Quirós C, et al. *Diabetes Therapy* 2024, 15(7): 1513–1524.

[Objective: Diabetes Self-Management Education and Support (DSMES) is a critical component of diabetes care. This study aims to examine the effect of online-based educational interventions on diabetes management compared to face-to-face interventions.

Methods: A systematic review was conducted by searching three databases for studies in English or Spanish between December 2023 and March 2024. The inclusion criteria were studies that compared face-to-face DSMES with online interventions.

Results: The follow-up duration of the trials ranged from 1 to 12 months. Multidisciplinary teams delivered online DSMES through various means, including Short Message Service (SMS), telephone calls, video calls, websites, and applications. Online DSMES was found to be comparable to face-to-face interventions in terms of glycated hemoglobin (HbA1c) levels in people with type 1 diabetes (T1D). In contrast, online interventions that focus on weight management in people with type 2 diabetes (T2D)

have shown a significant reduction in HbA1c compared to face-to-face interventions. Online DSMES was found to be superior in terms of quality of life and cost-effectiveness in both T1D and T2D. None of the analyzed studies explored the differences between individual and group methodologies.

Conclusions: The current evidence indicates that online DSMES services provide at least comparable biomedical benefits to face-to-face interventions, suggesting that online interventions could be incorporated into clinical practice as a complement or reinforcement. However, further research is needed to explore the potential benefits and effectiveness of online group sessions in DSMES].

Disparities in diabetes processes of care among people experiencing homelessness: An opportunity for intervention

Wiens K, Bai L, Hwang S.W., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111748.

[Aims: To compare processes of diabetes care by homeless status.]

Enrolment of Black, Indigenous and People of Color (BIPOC) and female participants in the US diabetes trials spanning 2000 to 2020: A chronological survey

Zhang J, Peng M, Li J, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103074.

[Aims: Little is known about the enrolment practice of both Black, Indigenous and People of Color (BIPOC) and females in the US diabetes trials. We aimed to perform a chronological survey to evaluate the enrolment of BIPOC and female participants in the US diabetes randomized controlled trials (RCTs) over the past two decades.]

Urban–Rural Differences in the Prevalence of Diabetes Among Adults in Haryana, India: The ICMR-INDIAB Study (ICMR-INDIAB-18)

Kalra S, Anjana R.M., Verma M, et al. *Diabetes Therapy* 2024, 15(7): 1597–1613.

[Introduction: Diabetes is a multifactorial disease with far-reaching consequences. Environmental factors, such as urban or rural residence, influence its prevalence and associated comorbidities. Haryana—a north Indian state—has undergone rapid urbanisation, and part of it is included in the National Capital Region (NCR). The primary aim of the study is to estimate the prevalence of diabetes in Haryana with urban–rural, NCR and non-NCR regional stratification and assess the factors affecting the likelihood of having diabetes among adults.

Methods: This sub-group analysis of the Indian Council of Medical Research-India Diabetes (ICMR-INDIAB) study (a nationally representative cross-sectional population-based survey) was done for Haryana using data from 3722 participants. The dependent variable was diabetes, while residence in NCR/non-NCR and urban–rural areas were prime independent variables. Weighted prevalence was estimated using state-specific sampling weights and standardized using National Family Health Survey-5 (NFHS-5) study weights. Associations were depicted using bivariate analysis, and factors describing the likelihood of living with diabetes were explored using a multivariable binary logistic regression analysis approach.

Results: Overall, the weighted prevalence of diabetes in Haryana was higher than the national average (12.4% vs. 11.4%). The prevalence was higher in urban (17.9%) than in rural areas (9.5%). The prevalence of diabetes in rural areas was higher in the NCR region, while that of prediabetes was higher in rural non-NCR region. Urban–rural participants' anthropometric measurements and biochemical profiles depicted non-significant differences. Urban–rural status, age and physical activity levels were the most significant factors that affected the likelihood of living with diabetes.

Conclusions: The current analysis provides robust prevalence estimates highlighting the urban–rural disparities. Urban areas continue to have a high prevalence of diabetes and prediabetes; rural areas depict a much higher prevalence of prediabetes than diabetes. With the economic transition rapidly bridging the gap between urban and rural populations, health policymakers should plan efficient strategies to tackle the diabetes epidemic.]

Children with diabetes

Articles

Incidence of type 1 diabetes in Sardinian children aged 0–14 years has almost doubled in the last twenty years. On top of the world

Ripoli C, Ricciardi M.R., Angelo M.R., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111750.

[Aims: The primary objectives were to investigate the incidence rate (IR) of type 1 diabetes (T1D) in Sardinian children aged 0–14 years in 2019–2022 and to examine the temporal trend from 1989–1999.]

Lack of access to insulin: undermining the Rights of the Child

Heller O, Duperrex O, Jaffé P.D., et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.444-445.

[2024 marks the centenary of the League of Nations' Declaration of the Rights of the Child. The Geneva Declaration highlighted the health needs of children and proclaimed the duty of governments to respond to these needs. ¹ Its influence led to the adoption of the 1989 Convention on the Rights of the Child that imposes obligations on governments, with regard to the right to life (article 6) and the right to health (article 24), which must be granted to every child without discrimination (article 2). ²]

Reports

Understanding the association between COVID-19 and new-onset diabetes in children, including diabetic ketoacidosis (DKA).

Waite M, Hards K. *Evidence-Based Nursing* 2024;27(3):100.

[**Context:** There is a need for a better understanding of the association between new-onset diabetes mellitus and SARS-CoV-2 in children, including DKA in the newly diagnosed and DKA in those with pre-existing diabetes. Ponmani et al ¹ retrospectively reviewed children aged 6 months– 16 years who presented in emergency departments (EDs) in the UK and Ireland with (1) new-onset type 1 (T1D) or type 2 (T2D) diabetes; (2) DKA during the COVID-19 pandemic in comparison with the preceding year.]

Co-morbidities (find here cardiovascular, kidney disease, neuropathy, diabetic retinopathy etc)

Cardiovascular Disease

Articles

The association between glycated hemoglobin levels and long-term prognosis in patients with diabetes and triple-vessel coronary disease across different age groups: A cohort study

Li Q, Yuan D, Zeng G, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111751.

[**Aim:** Our study aimed to investigate the correlation between glycated hemoglobin (HbA1c) and adverse prognostic events in patients with diabetes and triple-vessel coronary disease (TVD).]

Common carotid artery intima media thickness (CIMT) in patients with prediabetes and newly diagnosed type 2 diabetes mellitus

Gateva A, Assyov Y, Karamfilova V, et al. *Journal of Diabetes and Its Complications*, 2024, 38(7), Article 108766.

[**Aim:** To evaluate the relationship between common carotid artery intima media thickness (CIMT) in patients with prediabetes and new-onset diabetes mellitus without proven cardiovascular disease and some classic cardio-metabolic risk factors.]

Corrigendum to “The association between changes in hepatic steatosis and hepatic fibrosis with cardiovascular outcomes and mortality in patients with new-onset type 2 diabetes: A nationwide cohort study” [Diabetes Res. Clin. Pract. 194 (2022) 110191]

Park J, Kim G, Kim B.S., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111742.

[The authors regret that the above-mentioned published article omitted the following sentence in the Acknowledgments section.]

Effect of SGLT2 inhibitors on heart failure outcomes and cardiovascular death across the cardiometabolic disease spectrum: a systematic review and meta-analysis

Usman M.S., Bhatt D.L., Hameed I, et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.447-461.

[**Background:** Sodium–glucose co-transporter-2 (SGLT2) inhibitors have been studied in patients with heart failure, type 2 diabetes, chronic kidney disease, atherosclerotic cardiovascular disease, and acute myocardial infarction. Individual trials were powered to study composite outcomes in one disease state. We aimed to evaluate the treatment effect of SGLT2 inhibitors on specific clinical endpoints across multiple demographic and disease subgroups.]

Genetic Causality between Type 1 Diabetes and Arrhythmia Identified by a Two-sample Mendelian Randomization Study

Liu Y, Rao J, Hu W, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111725.

[**Background:** Clinical studies have shown that cardiovascular diseases in patients with type 1 diabetes (T1D) are often atypical or asymptomatic. The link between T1D and arrhythmia remains unclear. To infer causality between T1D and arrhythmia at the genetic level, we conducted a Mendelian randomization study through the genetic tools of T1D.]

Relationship of neutrophil-to-lymphocyte ratio, in addition to C-reactive protein, with cardiovascular events in patients with type 2 diabetes

Hoes L.L.F., Riksen N.P., Geleijnse J.M., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111727.

[**Aim:** To quantify the relationship of neutrophil-to-lymphocyte ratio (NLR) with cardiovascular events and all-cause mortality in patients with type 2 diabetes (T2D), independent of C-reactive protein (CRP).]

The resistive and pulsatility indices of the dorsal metatarsal artery for the screening of peripheral lower artery disease in patients with and without diabetes

Ciuti G, Monami M, Raghianti B, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111732.

[**Background:** In lower extremity peripheral artery disease (PAD), the ankle-brachial index (ABI) is an easily reproducible diagnostic tool for PAD, but it loses reliability when > 1.4 due to calcification of the vessel wall. Patients with diabetes are at higher risk for wall calcification. In order to overcome the limitation and reliability of ABI, particularly in patients with diabetes, we decided to assess resistive (RI) and pulsatility index (PI) by ultrasound doppler of the dorsal metatarsal artery (DMA).]

Sex differences in risk of incident microvascular and macrovascular complications: a population-based data-linkage study among 25 713 people with diabetes

Gibson A.A., Cox E, Schneuer F.J., et al. *Journal of Epidemiology & Community Health* 2024;78(8):479-486.

[**Background:** The global prevalence of diabetes is similar in men and women; however, there is conflicting evidence regarding sex differences in diabetes-related complications. The aim of this study was to investigate sex differences in incident microvascular and macrovascular complications among adults with diabetes.]

Reports

Patients with diabetes mellitus are more likely to present without typical chest pain during a myocardial infarction

Mohib T, Turin T.C. *Evidence-Based Nursing* 2024;27(3):102.

[**Context:** Myocardial infarction (MI) is a leading cause of morbidity and mortality, particularly among patients with diabetes mellitus (DM).¹ Early diagnosis of MI is crucial to initiate effective treatment and achieve improved outcomes.¹ While chest pain is a classic presenting symptom in MI diagnosis, it can become complicated in patients with long-standing DM, as they may present with 'no chest pain' or 'atypical symptoms'.¹ To investigate the likelihood of experiencing chest pain during an MI among patients with and without DM, Kumar et al² conducted a systematic review and meta-analysis (SRMA).³ The study aimed to quantify the odds of having 'no chest pain' or 'atypical symptoms' during an MI in patients with DM compared with those without DM.]

Diabetic Neuropathy

Articles

Assessment of neuropathy subtypes in type 1 diabetes

Karlsson P, Sjogaard M.B., Schousboe K, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004289

[**Introduction:** Diabetic polyneuropathy (DPN), a common complication of diabetes, can manifest as small, large, or mixed fiber neuropathy (SFN, LFN, and MFN, respectively), depending on the type of fibers involved. Despite evidence indicating small fiber involvement prior to large fiber involvement in type 1 diabetes mellitus (T1DM)-associated DPN, no evidence has been produced to determine the more prevalent subtype. We aim to determine the more prevalent type of nerve fiber damage—SFN, LFN, and MFN—in T1DM-associated DPN, both with and without pain.]

Diabetic peripheral neuropathy and glycemic variability assessed by continuous glucose monitoring: A systematic review and meta-analysis

Jia Y, Long D, Yang Y, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111757.

[Continuous glucose monitoring (CGM)-derived metrics have been used to accurately assess glycemic variability (GV) to facilitate management of diabetes mellitus, yet their relationship with diabetic peripheral neuropathy (DPN) is not fully understood. We performed a systematic review and meta-analysis to evaluate the association between GV metrics and the risk of developing DPN. Nine studies totaling 3,649 patients with type 1 and type 2 diabetes mellitus were included. A significant association was found between increased GV, as indicated by metrics including standard deviation (SD) with OR and 95% CI of 2.58 (1.45–4.57), mean

amplitude of glycemic excursions (MAGE) with OR and 95% CI of 1.90 (1.01–3.58), mean of daily difference (MODD) with OR and 95% CI of 2.88 (2.17–3.81) and the incidence of DPN. Our findings support a link between higher GV and an increased risk of DPN in patients with diabetes. These findings highlight the potential of GV metrics as indicators for the development of DPN, advocating for their inclusion in diabetes management strategies to potentially mitigate neuropathy risk. Longitudinal studies with longer observation periods and larger sample sizes are necessary to validate these associations across diverse populations.]

Eye Diseases

Articles

Comparative study of widefield swept-source optical coherence tomography angiography in eyes with concomitant age-related macular degeneration and diabetic retinopathy.

Finn M, Baldwin G, Garg I, et al. *British Journal of Ophthalmology* 2024;108(7):963-970.

[**Background/aims:** We sought to evaluate widefield swept-source optical coherence tomography angiography (WF SS-OCTA) among eyes with concomitant age-related macular degeneration (AMD) and diabetes mellitus or diabetic retinopathy (DM/DR).]

Evaluating the outcome of screening for glaucoma using colour fundus photography-based referral criteria in a teleophthalmology screening programme for diabetic retinopathy

Tan R, Teo K.Y.C., Husain R, et al. *British Journal of Ophthalmology* 2024;108(7):933-939.

[**Aims:** To evaluate the effectiveness of glaucoma screening using glaucoma suspect (GS) referral criteria assessed on colour fundus photographs in Singapore's Integrated Diabetic Retinopathy Programme (SiDRP).]

Single-cell transcriptomic analysis reveals the antiangiogenic role of Mgarp in diabetic retinopathy

Ren L, Xia J, Huang C, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004189

[**Introduction:** Diabetic retinopathy (DR) is a common vascular complication of diabetes mellitus and a leading cause of vision loss worldwide. Endothelial cell (EC) heterogeneity has been observed in the pathogenesis of DR. Elucidating the underlying mechanisms governing EC heterogeneity may provide novel insights into EC-specific therapies for DR.]

Kidney Disease

Articles

Acute kidney injury, renal impairment and renal failure associated with sodium glucose co-transporter-2 inhibitors in at-risk groups: A systematic review

Ziser K.E.D., Livori A.C., Morton J.I., et al. *British Journal of Clinical Pharmacology* 2024;90(7):1541-1558.

[Randomized controlled trials (RCTs) show a reduction in acute kidney injury, renal impairment and acute renal failure after initiation of a sodium glucose cotransporter-2 inhibitor. Observational literature on the association is conflicting, but important to understand for populations with a higher risk of medication-related adverse renal events. We aimed to systematically review the literature to summarize the association between sodium glucose

cotransporter-2 inhibitor use and acute kidney injury, renal impairment and acute renal failure in three at-risk groups: older people aged >65 years, people with heart failure and people with reduced renal function. A systematic search of Embase (1974 until 23 February 2024) and PubMed (1946 until 23 February 2024) was performed. RCTs were included if they reported numbers of acute kidney injury or acute renal failure in people using sodium glucose cotransporter-2 inhibitors compared to other diabetic therapies. Studies needed to report results by level of renal function, heart failure status or age. Of 922 results, eight studies were included. The absolute risk of acute kidney injury or acute renal failure was higher in people >65 years compared to those <65 years, higher in people with heart failure (vs without) and higher in people with reduced kidney function (vs preserved kidney function), but insufficient evidence to determine if the relative effect of sodium glucose cotransporter-2 inhibitors on this risk was similar for each group. At-risk cohorts are associated with a higher incidence of acute kidney problems in users of sodium glucose cotransporter-2 inhibitors.]

Association between dietary protein intake and mortality among patients with diabetic kidney disease

Wu Y, Chen J, Tao Y, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103091.

[**Aims:** This study aimed to investigate the association between dietary protein intake and mortality among patients with diabetic kidney disease.]

Effects of insonification on repairing the renal injury of diabetic nephropathy rats

Xiao X, Wu L, Deng J, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004146

[**Introduction:** Prolonged hyperglycemia in diabetes mellitus can result in the development of diabetic nephropathy (DN) and increase the susceptibility to kidney failure. Low-intensity pulsed ultrasound (LIPUS) is a non-invasive modality that has demonstrated effective tissue repair capabilities. The objective of this study was to showcase the reparative potential of LIPUS on renal injury at both animal and cellular levels, while also determining the optimal pulse length (PL).]

Molecular mechanisms of gut microbiota in diabetic nephropathy

Cheng G, Liu Y, Guo R, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111726.

[Diabetic nephropathy is a common complication of diabetes and a considerable contributor to end-stage renal disease. Evidence indicates that glucose dysregulation and lipid metabolism comprise a pivotal pathogenic mechanism in diabetic nephropathy. However, current treatment outcomes are limited, as they only provide symptomatic relief without preventing disease progression. The gut microbiota is a group of microorganisms that inhabit the human intestinal tract and play a crucial role in maintaining host energy balance, metabolism, and immune activity. Patients with diabetic nephropathy exhibit altered gut microbiota, suggesting its potential involvement in the onset and progression of the disease. However, how a perturbed microbiota induces and promotes diabetic nephropathy remains unelucidated. This article summarizes the evidence of the impact of gut microbiota on the progression of diabetic nephropathy, with a particular focus on the molecular mechanisms involved, aiming to provide new insights into the treatment of diabetic nephropathy.]

Temporal and regional trends in adults with diabetes kidney disease in the US from 1999 to 2020

Sardar M.B., Ahmed S, Ashraf H, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111729.

[**Aims:** We aim to analyze trends in mortality rates among adults with diabetic kidney disease (DKD) in the US from 1999 to 2020.]

Liver Disease

Articles

FIB-4 as a screening and disease monitoring method in pre-fibrotic stages of metabolic dysfunction-associated fatty liver disease (MASLD)

Albert S.G., Wood E.M. *Journal of Diabetes and Its Complications*, 2024, 38(7), Article 108777.

[**Aims:** Guidelines emphasize screening high-risk patients for metabolic dysfunction-associated steatotic liver disease (MASLD) with a calculated FIB-4 score for therapy to reverse fibrosis. We aimed to determine whether FIB-4 can effectively screen and monitor changes in steatohepatitis (MASH).]

Complications (find here atherosclerosis, claudication, diabetic foot, ulcers etc)

General

Articles

Lower achievement of guideline recommended care in Canadian adults with early-onset diabetes: A population-based cohort study

Sriskandarajah A, Metcalfe A, Nerenberg K.A., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111756.

[**Aims:** Adults with early-onset diabetes (age < 40 years) have an increased risk of complications, and it is unclear whether they are receiving guideline recommended care. We compared the frequency and results of haemoglobin A1c (HbA1c) testing in adults with early-onset and usual-onset diabetes and assessed factors related to guideline concordance.]

Amyloidosis

Articles

Comprehensive investigation of insulin-induced amyloidosis lesions in patients with diabetes at clinical and histological levels: A systematic review

Karkhaneh L, Hosseinkhani S, Azami H, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103083.

[**Introduction:** Insulin-derived amyloidosis (AIns), a skin complication in patients with diabetes, causes impaired insulin absorption. This systematic review aims to get a better understanding of this overlooked condition.]

Diabetic Foot

Articles

Analysis of Distribution and Drug Susceptibility Test Results of Pathogenic Bacteria in Diabetic Foot Ulcers

Wu M, Guo F, He X, et al. *Diabetes Therapy* 2024, 15(7): 1627–1637.

[Introduction: This study aimed to determine the pathogen distribution and drug susceptibility of diabetic foot wound secretions in a tertiary hospital in a coastal area of southeastern China to guide clinical antibiotic selection.

Methods: A retrospective analysis was conducted on 212 patients with diabetic foot hospitalized at Xiamen Third Hospital from 2018 to 2023, and foot wound secretions were collected for microbial culture and drug susceptibility testing.

Results: Among 212 cases of patients with diabetic foot wound secretions, 163 cases (76.9%) were cultured with pathogenic bacteria, and a total of 207 strains of pathogenic bacteria were cultured, including 75 strains (36.23%) of Gram-positive (G+) bacteria, 118 strains of Gram-negative (G-) bacteria (57.00%), 14 strains of fungi (6.76%), 120 cases of single microorganism infection (73.62%), 43 cases of mixed infection (26.38%), and 15 strains of multidrug-resistant bacteria (7.25%). The top three pathogenic bacteria were *Staphylococcus aureus*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa*. G+ bacteria were dominated by *S. aureus*. Drug susceptibility results showed that G+ bacteria were highly susceptible to vancomycin, linezolid, tigecycline, quinupristin/dalfopristin, rifampicin, and furotoxin, and somewhat resistant to penicillin, erythromycin, clindamycin, and ceftiofuran. Among G- bacterial infections, *Klebsiella pneumoniae*, *Pseudomonas aeruginosa*, *Escherichia coli*, and *Proteus* were the major species. Drug susceptibility testing indicated that carbapenems such as imipenem and ertapenem were the most effective antibacterial drugs against G- strains, followed by amikacin, piperacillin, and tazobactams to which these bacteria were also relatively sensitive, while resistance to

penicillins and first-generation cephalosporins increased significantly. We isolated one strain of pathogenic bacteria from a Wagner grade 1 ulcer, which was G+ bacteria. In Wagner grade 2 ulcers, the distribution of pathogenic bacteria was mainly G+ bacteria. In Wagner grade 3 and 4 ulcers, the distribution of pathogenic bacteria was mainly G- bacteria, and the increased rate of mixed infection was mainly due to mixed infection of G+ and G-. Two strains of pathogenic bacteria were isolated at Wagner grade 5, which were mixed infections of G+ and G-.

Conclusions: Pathogenic bacteria in diabetic foot wounds are predominantly G- bacteria, followed by G+ bacteria. As the Wagner ulcer grade increases, the distribution of pathogenic bacteria changes from G+ bacteria to G- bacteria, and the mixed infection rate increases. G+ bacteria are highly susceptible to vancomycin, linezolid, tigecycline, quinupristin/dalfopristin, rifampicin, and furotoxin, and somewhat resistant to penicillin, erythromycin, clindamycin, and ceftiofuran. G- bacteria are more sensitive to

the antimicrobial drugs ertapenem, imipenem, amikacin, piperacillin tazobactam, and have high resistance to penicillin and first-generation cephalosporins.]

Causes, prevention, and management of diabetes-related foot ulcers

Jeffcoate W, Boyko E.J., Game F, et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.472-482.

[In this Review, we aim to complement the 2023 update of the guidelines of the International Working Group on the Diabetic Foot. We highlight the complexity of the pathological processes that underlie diabetes-related foot ulceration (DFU) and draw attention to the potential implications for clinical management and outcome. Variation observed in the incidence and outcome of DFUs in different communities might result from differences in study populations and the accessibility of care. Comparing differences in incidence, management, and outcome of DFUs in different communities is an essential component of the quality of disease care. Additionally, these comparisons can also highlight the relationship between DFU incidence, management, and outcome and the structure of local clinical services and the availability of staff with the necessary skills. The clinical outcome is, however, also dependent on the availability of multidisciplinary care and the ability of people with DFUs to gain access to that care.]

Clinical outcomes in people with diabetes-related foot infections: Analysis from a limb preservation service infection database

Malone M, Bergamin E, Hayashi K, et al. *Journal of Foot and Ankle Research* 2024;17(3):e12040.

[**Background:** Diabetes-related foot infections are common and represent a significant clinical challenge. There are scant data about outcomes from large cohorts. The purpose of this study was to report clinical outcomes from a large cohort of people with diabetes-related foot infections.]

Exploring the psychosocial burden of foot complications in diabetes: A cross-sectional survey and qualitative interview study in a United Kingdom coastal community

Chapman L.S., Cochrane S, Sykes G, et al. *Journal of Foot and Ankle Research* 2024;17(3):e12038.

[**Background:** Foot complications in diabetes are common and destructive, resulting in substantial healthcare costs and high rates of morbidity. Coastal areas have a significantly higher burden of disease. People with diabetes experience disproportionately high rates of psychological health issues, including anxiety, depression and diabetes distress. These can affect self-management and concordance with preventive measures and treatments of foot complications, negatively impacting on outcomes. Access to psychological health services is variable across the United Kingdom and there is a paucity of high-quality evidence for the effectiveness of treatments for diabetes distress. This study aimed to explore experiences of psychosocial burden and perceptions and experiences of psychosocial support, among patients with diabetes and foot complications living in a coastal area.]

Diabetic Ketoacidosis

Articles

Development and validation of a nomogram to predict diabetes ketoacidosis resolution time in a tertiary care hospital in the United Arab Emirates

Almazrouei R, Siddiqua A.R., Alanqar A, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111763.

[**Aim:** This study aimed to develop and validate a nomogram to predict prolonged diabetes ketoacidosis (DKA) resolution time (DRT).]

Diabetes and pregnancy

Articles

Chorionicity and gestational diabetes mellitus in twin pregnancies in relation to placental weight

Khalil M.R., Demircioglu F, François C.V., et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103093.

[**Background:** Gestational diabetes mellitus (GDM) is glucose intolerance first detected during pregnancy. Twin pregnancies have a higher risk of GDM, likely due to increased placental mass and elevated placental lactogen levels.

[**Objective:** The aims of this study were 1) to assess the impact of chorionicity on the development of GDM in twin pregnancies and 2) to assess a possible association between placenta weight and the development of GDM.]

Comment on: Prevalence and treatment of gestational diabetes in Norway 2010–2020

Khan A.B., Mushtaq S. *Diabetes Research and Clinical Practice* 2024, 213: 111765.

[To the Editor, we have read the article “Prevalence and treatment of gestational diabetes in Norway 2010–2020” by Lars J. Kjerpeseth et al. [1]. The author’s diligent efforts deserve appreciation. We agree with the ultimate findings of the study that, both prevalence and pharmacological treatment of GDM increased from 2010 to 2016, followed by a plateau. However, it would be a privilege to append a few points, which would enrich the study’s findings.]

Corrigendum to “Type 2 diabetes after a pregnancy with gestational diabetes among first nations women in Australia: The PANDORA study” [Diabetes Res. Clin. Pract. 181 (2021) 109092]

Wood A.J., Boyle J.A., Barr E.L.M., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111687.

[The authors regret an error occurred in the first bar graph for Fig. 1 in the above-mentioned article.]

Articles

Assessment of neuropathy subtypes in type 1 diabetes

Karlsson P, Sjogaard M.B., Schousboe K, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004289

[Introduction: Diabetic polyneuropathy (DPN), a common complication of diabetes, can manifest as small, large, or mixed fiber neuropathy (SFN, LFN, and MFN, respectively), depending on the type of fibers involved. Despite evidence indicating small fiber involvement prior to large fiber involvement in type 1 diabetes mellitus (T1DM)-associated DPN, no evidence has been produced to determine the more prevalent subtype. We aim to determine the more prevalent type of nerve fiber damage—SFN, LFN, and MFN—in T1DM-associated DPN, both with and without pain.]

Changes in Basal and Bolus Insulin Requirements with Tirzepatide as an Adjunctive Therapy in Adults with Type 1 Diabetes Using Tandem Control-IQ

Karakus K.E., Klein M.P., Akturk H.K., et al. *Diabetes Therapy* 2024, 15(7): 1647–1655.

[Introduction: This study was aimed at investigating changes in insulin requirements and glycemic outcomes in adults with type 1 diabetes (T1D) using Control IQ (Tandem Diabetes) automated insulin delivery system (AID) over 8 months of tirzepatide treatment.

Methods: In this single-center, observational study, we collected demographic, A1c, weight, sensor glucose, and insulin dose data for adults with T1D who were using AID and initiated tirzepatide adjunct therapy for clinical indications (n = 11, median age 37, 64% female and mean body mass index of 39.6 kg/m²). Data were compared from baseline and over 8 months.

Results: Within 2 months of tirzepatide treatment, there were significant reductions in total daily insulin [median (IQR) 73.9 (47.6–95.8) to 51.7 (46.7–66.8) units/day, p<0.001], basal insulin [47 (28.2–51.8) to 32.4 (25.5–46.3) units/day, p < 0.001], and bolus insulin [31.4 (19.9–38.3) to 17.9 (14.9–22.2) units/day, p < 0.001] requirements. Insulin dose reduction from 2 to 8 months was modest. The frequency of

user-initiated boluses did not differ throughout the study. Despite reductions in total insulin requirement, time in range (70–180 mg/dl) increased by 7%, A1c reduced by 0.5%, weight reduced by 9%, without increase in time below 70 mg/dl.

Conclusions: This pilot study provides clinical guidance on insulin titration for adults with T1D who may initiate tirzepatide therapy. Based on the findings of this study, we recommend reducing 25% of total daily insulin dose at tirzepatide initiation in adults with T1D using AID with baseline A1c of less than 7.5%. Higher doses of tirzepatide were associated with greater weight loss, however, the reduction in insulin requirement was minimal.]

Environmental Determinants of Islet Autoimmunity (ENDIA) longitudinal prospective pregnancy to childhood cohort study of Australian children at risk of type 1 diabetes: parental demographics and birth information

Thomson R.L., Oakey H, Haynes A, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004130

[Introduction: The Environmental Determinants of Islet Autoimmunity (ENDIA) Study is an ongoing Australian prospective cohort study investigating how modifiable prenatal and early-life exposures drive the development of islet autoimmunity and type 1 diabetes (T1D) in

children. In this profile, we describe the cohort's parental demographics, maternal and neonatal outcomes and human leukocyte antigen (HLA) genotypes.]

Incidence of type 1 diabetes in Sardinian children aged 0–14 years has almost doubled in the last twenty years. On top of the world

Ripoli C, Ricciardi M.R., Angelo M.R., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111750.

[**Aims:** The primary objectives were to investigate the incidence rate (IR) of type 1 diabetes (T1D) in Sardinian children aged 0–14 years in 2019–2022 and to examine the temporal trend from 1989-1999.]

Increased frequency of microalbuminuria in patients with type 3 autoimmune polyglandular syndrome (APS) compared to isolated autoimmune type 1 diabetes mellitus: A real-life study

Radellini S, Vigneri E, Ferreri O, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111746.

[**Aim of the study:** The primary aim of the study was to evaluate the differences in metabolic control and chronic microvascular complications in patients with type 3 autoimmune polyglandular syndrome (APS3), compared to type 1 diabetes mellitus (T1DM) alone. Secondary aims were to evaluate the age of autoimmune thyroid disease (AIT) onset and the effects of levothyroxine treatment on metabolic control in patients with APS3.]

Genetic Causality between Type 1 Diabetes and Arrhythmia Identified by a Two-sample Mendelian Randomization Study

Liu Y, Rao J, Hu W, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111725.

[**Background:** Clinical studies have shown that cardiovascular diseases in patients with type 1 diabetes (T1D) are often atypical or asymptomatic. The link between T1D and arrhythmia remains unclear. To infer causality between T1D and arrhythmia at the genetic level, we conducted a Mendelian randomization study through the genetic tools of T1D.]

An integrated diabetes and mental health intervention for people with type 1 diabetes and severe disordered eating: a prospective proof-of-concept cohort study

Ismail K, Turner D, Brown J, et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.442-444.

[Disordered eating is a phenomenon that affects approximately 30% of people with type 1 diabetes, and is characterised by omission of some amount of insulin secondary to fear of weight gain. 12 Depending on the dose and type of insulin omitted, the subsequent persistent hyperglycaemia, polyuria, and osmotic diuresis results in a catabolic and dehydrated state, characterised by rapid weight loss. Rapid re-insulinisation after diabetic ketoacidosis can lead to oedema and rapid weight gain, often experienced as uncomfortable physical sensations, reinforcing the individual's negative belief that insulin is causing weight gain, promoting a recurring cycle of insulin omission. Type 1 diabetes with disordered eating is associated with earlier onset of microvascular complications and a three-times increased risk of mortality compared with type 1 diabetes alone. 12 Low-intensity psychological interventions have not been found to be effective in improving glycaemic control in this group of people. 3 We developed diagnostic criteria and a risk score for type 1 diabetes and disordered eating (the T1DE risk score). We also developed an innovative hub-and-spoke service that integrates diabetes and mental health treatments. We aimed to determine whether use of the service would improve HbA 1c rates of hospital admissions for diabetic ketoacidosis, severe

hypoglycaemia, T1DE risk score, and patient-reported outcomes, consisting of symptoms of depression, anxiety, disordered eating, and diabetes distress.]

Participation and psychosocial supports in the school setting for children with type 1 diabetes: A discrete choice experiment of carer priority

Ride J, Cameron L, Jones R, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111753.

[School-based diabetes care is an important consideration for clinicians and families alike. This Discrete-Choice Experiment describes parental preference for enhanced psychosocial and activity-focused supports over academic supports for children with Type 1 diabetes in Australian primary and secondary schools.]

Prediction of progression to type 1 diabetes with dynamic biomarkers and risk scores

Joglekar M.V., Kaur S, Pociot F, et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.483-492.

[Identifying biomarkers of functional β -cell loss is an important step in the risk stratification of type 1 diabetes. Genetic risk scores (GRS), generated by profiling an array of single nucleotide polymorphisms, are a widely used type 1 diabetes risk-prediction tool. Type 1 diabetes screening studies have relied on a combination of biochemical (autoantibody) and GRS screening methodologies for identifying individuals at high-risk of type 1 diabetes. A limitation of these screening tools is that the presence of autoantibodies marks the initiation of β -cell loss, and is therefore not the best biomarker of progression to early-stage type 1 diabetes. GRS, on the other hand, represents a static biomarker offering a single risk score over an individual's lifetime. In this Personal View, we explore the challenges and opportunities of static and dynamic biomarkers in the prediction of progression to type 1 diabetes. We discuss future directions wherein newer dynamic risk scores could be used to predict type 1 diabetes risk, assess the efficacy of new and emerging drugs to retard, or prevent type 1 diabetes, and possibly replace or further enhance the predictive ability offered by static biomarkers, such as GRS.]

Prevalence of latent and overt polyautoimmunity in type 1 diabetes: A systematic review and meta-analysis

Celis-Andrade M, Morales-González V, Rojas M, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103087.

[Background: Patients afflicted by type 1 diabetes (T1D) exhibit polyautoimmunity (PolyA). However, the frequency and distribution of PolyA in T1D is still unknown.

Objective: We conducted a systematic review and meta-analysis to define the prevalence of latent and overt PolyA in individuals with T1D.]

The quality of care in type 1 and type 2 diabetes – A 2023 update of the AMD Annals initiative

Russo G, De Cosmo S, Di Bartolo P, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111743.

[Aims: An initiative of continuous monitoring of the quality of diabetes care, promoted by the Association of Medical Diabetologists, is in place in Italy since 2006 (AMD Annals). The initiative was effective in improving quality of care indicators, assessed periodically through

standardized measures. Here, we show the 2023 AMD Annals data on type 2 (T2D) and type 1 (T1D) diabetes.]

A randomised controlled trial of additional bolus insulin using an insulin-to-protein ratio compared with insulin-to-carbohydrate ratio alone in people with type 1 diabetes following a carbohydrate-restricted diet

Hall R.M., Marshall H.J., Parry-Strong A, et al. *Journal of Diabetes and Its Complications*, 2024, 38(7), Article 108778.

[**Aims:** Postprandial hyperglycemia can be problematic for people with type 1 diabetes (T1DM) following carbohydrate-restricted diets. Bolus insulin calculated for meal protein plus carbohydrate may help. This study evaluated the effect of additional bolus insulin using an insulin-to-protein ratio (IPR) on glycaemic control.]

Diabetes mellitus Type 2

Articles

Age of type 2 diabetes onset as a risk factor for dementia: A 13-year retrospective cohort study

Messina R, Mezuk B, Rosa S, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111760.

[**Aims:** To examine whether age at type 2 diabetes onset is an independent predictor of dementia risk.]

Alarming rise in young-onset type 2 diabetes

The Lancet Diabetes & Endocrinology. *Lancet Diabetes & Endocrinology*, 2024, 12(7), p.433.

[A new report by Diabetes UK, published in May, 2024, showed an almost 40% increase in 5 years in the number of people diagnosed with type 2 diabetes in the UK who were younger than 40 years (between 2016–17 and 2022–23). On a global level, according to data from the 10th edition of the Diabetes Atlas, prevalence estimates of diabetes among people aged 20–39 years increased from 2.9% (63 million people) in 2013 to 3.8% (260 million) in 2021. It is indisputable that type 2 diabetes, typically a condition predominantly affecting middle-aged and older adults, has become increasingly prevalent in young populations.]

Asprosin levels in patients with type 2 diabetes mellitus, metabolic syndrome and obesity: A systematic review and meta-analysis

Ulloque-Badaracco J.R., Al-kassab-Córdova A, Hernandez-Bustamante E.A., et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103095.

[**Background & aims:** Asprosin is a promising candidate for novel treatments for metabolic–endocrine disorders. The objective of this systematic review and meta-analysis was to consolidate the existing evidence regarding asprosin levels in patients diagnosed with type 2 diabetes (T2D), metabolic syndrome (MetS), and obesity.]

Association of sodium-glucose cotransporter 2 inhibitor use with risk of osteoporotic fracture among older women: A nationwide, population-based cohort study

Lee S, Yu M.H., Hong N, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111712.

[**Introduction:** We investigated the relationship between sodium-glucose cotransporter-2 inhibitor (SGLT2i) and fracture in elderly women diagnosed with type 2 diabetes mellitus (T2DM) and newly prescribed antidiabetic medications (ADMs).]

Clinical Practice Guidelines for the Management of Type 2 Diabetes in South Asia: A Systematic Review

Pervez A, Ahmer A, Mahmud O, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103094.

[**Background:** Clinical practice guidelines (CPGs) are a helpful tool for the evidence-based management of Type 2 Diabetes Mellitus (T2D). The aim of this systematic review was to synthesize and appraise the scope and quality of South Asian T2D CPGs.]

Computational approaches for clinical, genomic and proteomic markers of response to glucagon-like peptide-1 therapy in type-2 diabetes mellitus: An exploratory analysis with machine learning algorithms

Villikudathil A.T., Mc Guigan D.H., English A. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103086.

[**Introduction:** In 2021, the International Diabetes Federation reported that 537 million people worldwide are living with diabetes. While glucagon-like peptide-1 agonists provide significant benefits in diabetes management, approximately 40% of patients do not respond well to this therapy. This study aims to enhance treatment outcomes by using machine learning to predict individual response status to glucagon-like peptide-1 therapy.]

The effect of SGLT2 inhibitors and GLP1 receptor agonists on arterial stiffness: A meta-analysis of randomized controlled trials

Rizos E.C., Tagkas C.F., Asimakopoulos A.G.I., et al. *Journal of Diabetes and Its Complications*, 2024, 38(7), Article 108781.

[**Background:** Pulse wave velocity (PWV) and augmentation index (AIx) are indices used to assess arterial stiffness. We evaluated the effect of sodium glucose co-transporter-2 inhibitors (SGLT2i) and glucagon-like peptide-1 receptor agonists (GLP1-RA) on arterial stiffness indices.]

The Efficacy and Safety of Sodium-Glucose Co-transporter 2 (SGLT2) Inhibitors in Real-World Clinical Practice: Potential Cautionary Use in Elderly Patients with Type 2 Diabetes (T2D)

Lee D.H., Oh J.H., Jeon H.J., et al. *Diabetes Therapy* 2024, 15(7): 1615–1626.

[**Introduction:** Sodium-glucose co-transporter 2 (SGLT2) inhibitors have shown safe and therapeutic efficacy in randomized controlled trials (RCT) to reduce adverse cardiorenal events in high-risk patients with type 2 diabetes (T2D). In this study, we investigated the efficacy and safety of SGLT2 intervention in patients with T2D in a real-world clinical practice to confirm the validity of the RCT results.

Methods: As a retrospective study, we evaluated medical records from 596 patients with T2D treated with SGLT2 inhibitors (dapagliflozin or empagliflozin) in addition to their prior drug regimen to improve glucose control between 2015 and 2019 in the Endocrinology Department

at Chungbuk National University Hospital. No control arm was evaluated to compare the effects of adding SGLT inhibitors to the pre-existing regimen. The primary objective was the measurement of glycated hemoglobin (HbA1c)

from each individual patient over a 36-month period at 6-month intervals. The secondary parameters were the measurement of fasting plasma glucose (FPG) and body weight (Bwt) changes, as well as the monitoring of adverse events (AEs) and determining the reasons for drug discontinuation.

Results: HbA1c levels were reduced at each of the time points throughout the 36-month period and were significantly reduced by 12.5% ($P < 0.01$) from time 0 ($8.8 \pm 1.3\%$) to 36 months ($7.7 \pm 1.0\%$). FPG levels [from basal (180 ± 60 mg/dL) to 36 months (138 ± 38 mg/dL)] and Bwt [from basal (74 ± 15 kg) to 36 months (72 ± 15 kg)] were also significantly reduced ($P < 0.01$) for both measurements in the SGLT2

inhibitor add-on group. Similar to HbA1c profile, the FPG and Bwt were measured at a consistently lower level at 6 months until the end of the study. The most common AEs were hypoglycemia ($n=57$), genitourinary infection (GUI) ($n = 31$), and polyuria ($n = 28$). In the elderly population (≥ 75 years old), AEs (31%) were generally more prevalent ($P < 0.001$) than those (21%) in the adult (< 75 years old) patients. Over the study period, 211 (35%) patients either dropped or completely discontinued the use of the SGLT2 inhibitor, and the elderly patients tended to have a higher discontinuation rate (52%; $P=0.005$) than the adults (33%).

Conclusions: In this study, we demonstrated that SGLT2 inhibitors are an effective and durable hypoglycemic agent to control blood glucose levels with reduced maintenance of Bwt, but their use in the elderly (≥ 75 years old) patients with T2D may warrant some additional caution due to increased probability of AEs and discontinuation of drug use.]

Impact of coffee and its bioactive compounds on the risks of type 2 diabetes and its complications: A comprehensive review

Mohamed A.I., Erukainure O.L., Salau V.F., et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103075.

[**Background:** Coffee beans have a long history of use as traditional medicine by various indigenous people. Recent focus has been given to the health benefits of coffee beans and its bioactive compounds. Research on the bioactivities, applications, and effects of processing methods on coffee beans' phytochemical composition and activities has been conducted extensively. The current review attempts to provide an update on the biological effects of coffee on type 2 diabetes (T2D) and its comorbidities.]

Out-of-pocket direct cost of ambulatory care of type 2 diabetes in Delhi: Estimates from the Delhi diabetes community-II (DEDICOM-II) survey

Rawat S, Bansal N, Yadav R, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103089.

[**Background & aim:** Much of the cost data from India is restricted to patients recruited purely from healthcare institutions and do not explore determinants. Therefore, the out of pocket expenditure for ambulatory diabetes care was evaluated in Delhi.]

Plasma sphingolipids mediate the association between gut microbiome composition and type 2 diabetes risk in the HELIUS cohort: a case-cohort study

Overbeek M.F., Rutters F, Nieuwdorp M, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004180

[**Introduction:** The association between the gut microbiome and incident type 2 diabetes (T2D) is potentially partly mediated through sphingolipids, however these possible mediating mechanisms have not been investigated. We examined whether sphingolipids mediate the association between gut microbiome and T2D, using data from the Healthy Life in an Urban Setting study.]

The quality of care in type 1 and type 2 diabetes – A 2023 update of the AMD Annals initiative

Russo G, De Cosmo S, Di Bartolo P, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111743.

[**Aims:** An initiative of continuous monitoring of the quality of diabetes care, promoted by the Association of Medical Diabetologists, is in place in Italy since 2006 (AMD Annals). The initiative was effective in improving quality of care indicators, assessed periodically through standardized measures. Here, we show the 2023 AMD Annals data on type 2 (T2D) and type 1 (T1D) diabetes.]

Real-world effectiveness of imeglimin in patients with type 2 diabetes: A retrospective longitudinal study in Japan

Katsuyama H, Hakoshima M, Heshiki T, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111752.

[**Objective:** To examine the real-world effects of imeglimin on glycemic control and other metabolic factors in patients with type 2 diabetes (T2DM).]

SGLT2 inhibitors in clinical practice

Rydén L, Norhammar A. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.434-435.

[On Sept 15, 2015, in Stockholm, the attendees at the Congress of the European Association for the Study of Diabetes were stunned by the presentation of the first randomised investigation of a sodium–glucose co-transporter-2 (SGLT2) inhibitor, empagliflozin, in the EMPA-REG OUTCOME trial 1 in patients with type 2 diabetes and atherosclerotic cardiovascular disease. The unexpected results (ie, an early-onset reduction in morbidity and mortality) caused the audience to stand up and applaud the first evidence that a drug, developed to lower glucose concentration, was associated with cardiovascular superiority due to a reduction of heart failure. Since then, the mortality reduction in the EMPA-REG OUTCOME trial has been questioned as this reduction was not seen in similar studies of other SGLT2 inhibitors. 2 This discrepancy might, however, relate to patients in the EMPA-REG OUTCOME being less ill or shorter periods of observation.]

Tirzepatide ameliorates eating behaviors regardless of prior exposure to glucagon-like peptide receptor agonists in Japanese patients with type 2 diabetes mellitus

Suzuki T, Sato T, Tanaka M, et al. *Journal of Diabetes and Its Complications*, 2024, 38(7), Article 108779.

[**Aims:** To investigate effects of tirzepatide, a dual receptor agonist for glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 (GLP-1), on eating behaviors.]

Articles

Advancing diabetes surveillance ecosystems: a case study of India

Varghese J.S., Peterson E.N., Ali M.K., et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.493-502.

[Professional society and expert guidelines recommend the achievement of glycaemic, blood pressure, and cholesterol targets to prevent the microvascular and macrovascular complications of diabetes. The WHO Diabetes Compact recommends that countries meet and monitor these targets for diabetes management. Surveillance—ie, continuous, systematic measurement, analysis, and interpretation of data—is a crucial component of public health. In this Personal View, we use the case of India as an illustration of the challenges and future directions needed for a diabetes surveillance system that documents national progress and persistent gaps. To address the growing burdens of diabetes and cardiometabolic diseases, the Government of India has launched programmes such as the National Programme for Prevention and Control of Non-Communicable Diseases. Different surveys have provided estimates of the diabetes care continuum of awareness, treatment, and control at the national, state, and, very recently, district level. We reviewed the literature to analyse how these surveys have varied in both their data collection methods and the reported estimates of the diabetes care continuum. We propose an integrated surveillance and monitoring framework to augment decentralised decision making, leveraging the complementary strengths of different surveys and electronic health record databases, such as data obtained by the National Programme for Prevention and Control of Non-Communicable Diseases, and building on methodological advances in model-based small-area estimation and data fusion. Such a framework could aid state and district administrators in monitoring the progress of diabetes screening and management initiatives, and benchmarking against national and global standards in all countries.]

Association between circulating levels of unsaturated fatty acids and risk for prediabetes in the NHANES 2003–2004 and 2011–2012

Zhang L, Liu J, Cao Y, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111728.

[**Aims:** This study aimed to investigate the association between serum levels of common and uncommon unsaturated fatty acids and prediabetes risk.]

Cerebellar gray matter and white matter damage among older adults with prediabetes

Chen Y, Li Z, Chen Y, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111731.

[**Aims:** To investigate alterations in cerebrum and cerebellum in prediabetes. Cerebellar injury in diabetes is traceable, but it has not been systematically studied, and whether cerebellar injury occurs and the degree of damage in prediabetes are not known.]

Circulating asprosin concentrations in individuals with new-onset type 2 diabetes and prediabetes

Diao H, Fan X, Li Z, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111730.

[**Aims:** This research aimed to clarify the relationship between serum asprosin levels and the occurrence of type 2 diabetes mellitus (T2DM) in light of mixed findings about the role of asprosin in T2DM and the lack of studies on its effects on prediabetic conditions.]

Glucose monitoring and control

Articles

Adherence and persistence to novel glucose-lowering medications in persons with type 2 diabetes mellitus undergoing routine care

O'Hara D.V., Janse R.J., Fu E.L., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111745.

[**Aims:** To assess adherence and persistence to sodium-glucose cotransporter-2 inhibitors (SGLT2i), glucagon-like peptide-1 receptor agonists (GLP1-RA), and dipeptidyl peptidase-4 inhibitors (DPP4i) in routine care.]

Can the postload-fasting glucose gap be used to determine risk of developing diabetes in chinese adults: A prospective cohort study

Xu X, Wang D, Jaffar S, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111761.

[**Objective:** To evaluate the relationship between fasting plasma glucose (FPG) and 2-hour postload plasma glucose (2hPG) measured during an oral glucose tolerance test, and the risk of developing diabetes in Chinese adults.]

Diabetic peripheral neuropathy and glycemic variability assessed by continuous glucose monitoring: A systematic review and meta-analysis

Jia Y, Long D, Yang Y, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111757.

[Continuous glucose monitoring (CGM)-derived metrics have been used to accurately assess glycemic variability (GV) to facilitate management of diabetes mellitus, yet their relationship with diabetic peripheral neuropathy (DPN) is not fully understood. We performed a systematic review and meta-analysis to evaluate the association between GV metrics and the risk of developing DPN. Nine studies totaling 3,649 patients with type 1 and type 2 diabetes mellitus were included. A significant association was found between increased GV, as indicated by metrics including standard deviation (SD) with OR and 95% CI of 2.58 (1.45–4.57), mean amplitude of glycemic excursions (MAGE) with OR and 95% CI of 1.90 (1.01–3.58), mean of daily difference (MODD) with OR and 95% CI of 2.88 (2.17–3.81) and the incidence of DPN. Our findings support a link between higher GV and an increased risk of DPN in patients with diabetes. These findings highlight the potential of GV metrics as indicators for the development of DPN, advocating for their inclusion in diabetes management strategies to potentially mitigate neuropathy risk. Longitudinal studies with longer observation periods and larger sample sizes are necessary to validate these associations across diverse populations.]

Effect of stevia on blood glucose and HbA1C: A meta-analysis

Zare M, Zeinalabedini M, Ebrahimpour-Koujan S, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103092.

[**Background:** The study investigates substituting non-nutritive sweeteners (NNS) for sugar to address health concerns related to excess sugar intake. It specifically examines how stevia affects insulin and blood glucose levels. The systematic review and meta-analysis aim to evaluate stevia's impact on glycemic indices.]

Gut microbiota-based prediction for the transition from normal glucose tolerance (NGT) to impaired glucose tolerance (IGT) in a remote island cohort study

Uema T, Tsukita M, Okamoto S, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111747.

[**Aim:** The present cohort study explored whether specific gut microbiota (GM) profile would predict the development of impaired glucose tolerance (IGT) in individuals with normal glucose tolerance (NGT).]

The impact of GLP-1 receptor agonist shortages on glycaemic Control: Findings from an Australian specialist diabetes clinic

Nanayakkara N, Huang M.L.H., Jenkins A.J., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111740.

[There have been shortages of glucagon-like peptide-1 receptor agonists (GLP-1 RA) for type 2 diabetes (T2D) care. Analyses of data from 811 T2D adults at an Australian specialist diabetes clinic (1/2019–10/2023) who received ≥ 2 GLP-1 RA prescriptions before and during the shortage showed median HbA1c levels significantly increased by 0.3 %.]

Impact of hospital-community diabetes management intervention in Central Region, Ghana: A retrospective study

Adong J.W., Adjei D.N., Adokiya M.N., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111762.

[**Objective:** Effective diabetes management remains suboptimal in low-resourced countries including Ghana. We determined the effectiveness of hospital-community link diabetes management intervention on glycaemic control and other outcomes.]

New Understanding Diabetes course on Continuous Glucose Monitoring (CGM)

International Diabetes Federation. *Diabetes Research and Clinical Practice* 2024, 213: 111766.

[The International Diabetes Federation, in collaboration with FIND, has launched a new free online course on Continuous Glucose Monitoring (CGM) available on the IDF School of Diabetes Understanding Diabetes platform.]

Surrogate measures of first-phase insulin secretion versus reference methods intravenous glucose tolerance test and hyperglycemic clamp: a systematic review and meta-analyses

Renklint R, Chninou Y, Heni M, et al. *BMJ Open Diabetes Research and Care* 2024;12:e004256

[Introduction: In this systematic review, we investigated the diagnostic accuracy of surrogate measures of insulin secretion based on fasting samples and the oral glucose tolerance test (OGTT). The first phase of insulin secretion was calculated using two gold standard methods; the hyperglycemic clamp (HGC) test and intravenous glucose tolerance test (IVGTT).]

Hyperglycaemia

Articles

Effect of hyperglycemia and empagliflozin on markers of cardiorenal injury and inflammation in patients with type 1 diabetes

Kugathasan L, Sridhar V.S., Lytvyn Y, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111764.

[Aims: To investigate the effect of hyperglycemia and empagliflozin on cardiorenal injury and inflammation in patients with uncomplicated type 1 diabetes (T1D).]

Hypoglycaemia

Articles

Follow up care for adults with diabetes treated for severe hypoglycemia by emergency medical Services, 2013–2019

Rode M.M., Boggust B.A., Manggaard J.M., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111741.

[Aims: To capture the types and content of healthcare encounters following severe hypoglycemia requiring emergency medical services (EMS) and to correlate their features with subsequent risk of severe hypoglycemia.]

Insulin therapies

Articles

Addressing the Burden of Multiple Daily Insulin Injections in Type 2 Diabetes with Insulin Pump Technology: A Narrative Review

Brixner D, Edelman S.V., Sieradzan R, et al. *Diabetes Therapy* 2024, 15(7): 1525–1534.

[The growing prevalence of type 2 diabetes (T2D) remains a leading health concern in the US. Despite new medications and technologies, glycemic control in this population remains suboptimal, which increases the risk of poor outcomes, increased healthcare resource utilization, and associated costs. This article reviews the clinical and economic impacts of suboptimal glycemic control in patients on basal-bolus insulin or multiple daily injections (MDI) and discusses how new technologies, such as tubeless insulin delivery devices, referred to as “patch pumps”, have the potential to improve outcomes in patients with T2D.]

Counseling for Insulin Icodec: A Proposed Practitioner's Guide

Kalra S, Bhattacharya S, Kapoor N, et al. *Diabetes Therapy* 2024, 15(7): 1491–1499.

[Despite insulin being a lifesaving medication, insulin distress, insulin hesitancy, and insulin inertia remain oft-repeated themes in diabetes discourse. The current model lists three issues: temperament, troublesomeness, and technicality, which contribute to insulin perceptions. Therapeutic patient education (TPE), value-added therapy (VAT), and medication counseling are concepts that assist in optimizing insulin perceptions. Insulin icodec is a basal insulin with a half-life of 196 h and a once-weekly or circaseptan frequency of administration. Insulin icodec reduces the frequency of basal insulin

administration to one-seventh, which along with the lower requirement of glucose monitoring, reduces the burden of plastic and ancillary supply disposal. Because of its unique frequency of injection, insulin icodec usage requires appropriate counseling and education. This reader-friendly counseling guide helps practitioners offer VAT, as well as TPE while prescribing icodec and other insulins.]

SPIRIT: Assessing Clinical Parameters Associated with Using IDegLira in Patients with Type 2 Diabetes in a Real-World Setting in Colombia

Ramírez-Rincón A, Henao-Carrillo D, Omeara M, et al. *Diabetes Therapy* 2024, 15(7): 1535–1545.

[Introduction: Insulin degludec/liraglutide (IDegLira) is a fixed-ratio combination of insulin degludec (a basal insulin) and liraglutide (a glucagon-like peptide-1 receptor agonist [GLP1RA]). This study aimed to investigate clinical outcomes in people with type 2 diabetes mellitus (T2DM) after initiating IDegLira treatment in a real-world setting in Colombia.

Methods: SPIRIT is a non-interventional, single-arm, retrospective chart review study to assess clinical outcomes in people with T2DM. Participating patients were switched from a treatment regimen of basal insulin (with or without oral antidiabetics [OADs]) and started on treatment with IDegLira a minimum of

26±6 weeks before the data collection start date. Data were collected from the medical records of 175 patients in ten clinical centers across Colombia.

Results: Compared with baseline, there was a significant reduction in glycated hemoglobin (HbA1c) (1.3%; 95% confidence interval [CI] – 1.6 to – 1.0; $p < 0.0001$) after 26 ± 6 weeks of follow-up. The mean HbA1c at baseline and at the end of the study was 9.1% and 7.8%, respectively. In addition, IDegLira significantly reduced absolute body weight by 1 kg (95% CI – 1.5 to – 0.5; $p < 0.0001$), from a mean of

76.1 kg at baseline to 75.1 kg after follow-up. The mean IDegLira dose at the end of the study was 21.3 U, and no severe hypoglycemic events were observed during the follow-up period.

Conclusion: In real-world practice, initiating IDegLira in patients with T2DM previously treated with basal insulin (±OAD) was associated with improved glycemic control, reduced body weight and reduced risk of hypoglycemia.]

Therapy-Related Satisfaction and Quality of Life for Japanese People with Diabetes Using Rapid-Acting Insulin Analogs: A Web-Based Survey

Ishii H, Maeda Y, Sato M, et al. *Diabetes Therapy* 2024, 15(7): 1577–1595.

[Introduction: Insulin degludec/liraglutide (IDegLira) is a fixed-ratio combination of insulin degludec (a basal insulin) and liraglutide (a glucagon-like peptide-1 receptor agonist [GLP1RA]). This study aimed to investigate clinical outcomes in people with type 2 diabetes mellitus (T2DM) after initiating IDegLira treatment in a real-world setting in Colombia.

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Conclusion: In real-world practice, initiating IDegLira in patients with T2DM previously treated with basal insulin (±OAD) was associated with improved glycemic control, reduced body weight and reduced risk of hypoglycemia.]

Management of diabetes (diet, exercise, lifestyle)

Articles

Effect of structured diet with exercise education on anthropometry and lifestyle modification in patients with type 2 diabetes: A 12-month randomized clinical trial

El-Deyarbi M, Ahmed L.A., King J, et al. *Diabetes Research and Clinical Practice* 2024, 213: 111754.

[**Aims:** Lifestyle modification involving active engagement of specialised dietitian with diet and exercise education, can be effective as first-line treatment for diabetes.]

Lifestyle modifies the associations of early-life smoking behaviors and genetic susceptibility with type 2 diabetes: A prospective cohort study involving 433,872 individuals from UK Biobank

Jiang X, Yang G, Feng N, et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103090.

[**Background:** To investigate whether and what lifestyle factors in later life modify the associations of early-life smoking behaviors and genetic susceptibility with type 2 diabetes (T2D).]

Articles

Diabetes distress: the psychological burden of living with diabetes

Poole L, Hackett R.A. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.439-441.

[Living with type 1 or type 2 diabetes requires patient's sustained engagement with multiple self-care behaviours including medication taking, healthy eating, and glucose monitoring. The ongoing demands of self-care coupled with a fear of complications takes a toll on these individuals. Diabetes distress refers to the emotional effect of living with diabetes and can include feelings of guilt, anxiety, and concerns about self-managing the condition. Six domains have been identified in relation to diabetes distress, namely: treatment regimen, food and eating, future and complications, hypoglycaemia, social and interpersonal relationships, and interactions with health-care professionals. ¹ Although symptoms of diabetes distress can include low mood, these feelings are centred on diabetes-related difficulties. In this way, diabetes distress is distinct from other forms of distress, such as depression, which is also prevalent in individuals with diabetes. Despite the conceptual overlap with depression, diabetes distress is not considered a psychiatric disorder. Diabetes distress is common and enduring, with prevalence estimates of more than 20% for both type 1 and type 2 diabetes. ² Given the stigma of poor mental health in some communities, the higher burden of diabetes among Black people and South Asians, and the higher reporting of diabetes distress symptoms among ethnic minorities, distress in diabetes might contribute to inequalities in diabetes.]

An integrated diabetes and mental health intervention for people with type 1 diabetes and severe disordered eating: a prospective proof-of-concept cohort study

Ismail K, Turner D, Brown J, et al. *Lancet Diabetes & Endocrinology*, 2024, 12(7), pp.442-444.

[Disordered eating is a phenomenon that affects approximately 30% of people with type 1 diabetes, and is characterised by omission of some amount of insulin secondary to fear of weight gain. ¹² Depending on the dose and type of insulin omitted, the subsequent persistent hyperglycaemia, polyuria, and osmotic diuresis results in a catabolic and dehydrated state, characterised by rapid weight loss. Rapid re-insulinisation after diabetic ketoacidosis can lead to oedema and rapid weight gain, often experienced as uncomfortable physical sensations, reinforcing the individual's negative belief that insulin is causing weight gain, promoting a recurring cycle of insulin omission. Type 1 diabetes with disordered eating is associated with earlier onset of microvascular complications and a three-times increased risk of mortality compared with type 1 diabetes alone. ¹² Low-intensity psychological interventions have not been found to be effective in improving glycaemic control in this group of people. ³ We developed diagnostic criteria and a risk score for type 1 diabetes and disordered eating (the T1DE risk score). We also developed an innovative hub-and-spoke service that integrates diabetes and mental health treatments. We aimed to determine whether use of the service would improve HbA 1c rates of hospital admissions for diabetic ketoacidosis, severe hypoglycaemia, T1DE risk score, and patient-reported outcomes, consisting of symptoms of depression, anxiety, disordered eating, and diabetes distress.]

Articles

Bone effects of metformin monotherapy and its combination with teneligliptin: A 12-week follow-up study in patients with type 2 diabetes mellitus

Shaik A.R., Kohli S, Vohora D. *Diabetes Research and Clinical Practice* 2024, 213: 111744.

[**Aims:** The skeletal effects of metformin monotherapy and in combination with teneligliptin are not well illustrated in patients with T2DM. To address this, we conducted an observational study to evaluate the effect of these oral hypoglycemic agents on bone turnover markers.]

Efficacy of Self-Review of Lifestyle Behaviours with Once-Weekly Glycated Albumin Measurement in People with Type 2 Diabetes: A Randomized Pilot Study

Jinnouchi H, Yoshida A, Taniguchi M, et al. *Diabetes Therapy* 2024, 15(7): 1561–1575.

[**Introduction:** Lifestyle management, including appropriate modifications of nutrition, exercise, and medication behaviors, is essential for optimal glycemic control. The absence of appropriate monitoring methods to validate the lifestyle change may hinder the modification and continuation of behaviors. In this study, we evaluated whether once-weekly glycated albumin (GA) measurement received via a smartphone application could improve glycemia management in patients with type 2 diabetes mellitus by supporting self-review and modification of lifestyle behaviors.

Methods: This open-label, randomized controlled, single-center study in Japan with an 8-week intervention period was conducted in individuals with type 2 diabetes mellitus and HbA1c levels between 7.0 and 9.0% (53–75 mmol/mol). The intervention was once-weekly home monitoring of GA with a daily self-review of lifestyle behaviors using a smartphone application, in addition to conventional treatment.

Results: A total of 98 participants (72.0% males; age 63.2±11.4 years; HbA1c 7.39±0.39% [57.3±4.3 mmol/mol]) were randomly assigned to the intervention or control group. Significant decreases of the GA and HbA1c levels from the baseline to the last observation day were observed in the intervention group ($-1.71 \pm 1.37\%$ [-39.1 ± 31.3 mmol/mol] and $-0.32 \pm 0.32\%$ [-3.5 ± 3.5 mmol/mol], respectively). Significant decreases of the body weight, waist circumference, and caloric expenditure ($p < 0.0001$ and $p = 0.0003$, $p = 0.0346$, respectively), but not of the caloric intake

($p = 0.678$), were also observed in the intervention group as compared with the control group.

Conclusions: Self-review of lifestyle behaviors in combination with once-weekly GA home testing received via a smartphone application might potentially benefit glycemic management in

people with type 2 diabetes mellitus.

Trial Registration: jRCTs042220048.]

Real-World Clinical Experience of Oral Semaglutide in a Secondary Diabetes Clinic in the UK: A Retrospective Observational Study

Williams D.M, Alberts B.A., Sharaf A, et al. *Diabetes Therapy* 2024, 15(7): 1639–1646.

[**Introduction:** Oral semaglutide improves cardiovascular risk factors in people with type 2 diabetes (T2D) in clinical trials, though real-world evidence is limited. We aimed to determine the real-world impact of oral semaglutide on routinely collected clinical data in our practice.

Methods: People with T2D initiated on oral semaglutide in secondary care diabetes clinics at two hospital sites in Wales (United Kingdom) were included. Data were collected on reasons for oral semaglutide initiation and changes in bodyweight, blood pressure, glycemic control, and lipid profiles over follow-up at 3–6 months, and at 6–12 months. Data were collected to determine the safety of oral semaglutide.

Results: Seventy-six patients were included, with a median age 59.3 [51.4–67.6] years, and 38 (50.0%) patients were female. The most common reasons for oral semaglutide were need for weight loss and improved glycemia (69.8%), and improved glycemia alone (25.0%). Oral semaglutide associated with significantly reduced bodyweight (– 3.3 kg), body mass index (BMI) (– 0.9 kg/m²), glycated hemoglobin

(HbA1c) (–11 mmol/mol), and total cholesterol (– 0.4 mmol/l) by 3–6 months follow-up. At 6–12 months, there was a significant reduction in systolic blood pressure (–7.0 mmHg), in addition to sustained reductions in other metabolic parameters. By 12 months, 18 (23.6%) patients had discontinued the drug, largely resulting from gastrointestinal disturbance, but there were no serious events in this cohort.

Conclusions: Oral semaglutide was effective in improving cardiovascular risk factors in this real-world population living with T2D, and no serious events were identified related to oral semaglutide in this patient group.]

Real-World Treatment Patterns Among Patients with Type 2 Diabetes Mellitus Initiating Treatment with Oral Semaglutide

Swift C, Frazer M.S., Gronroos N.N., et al. *Diabetes Therapy* 2024, 15(7): 1547–1559.

[Introduction: The treatment landscape for type 2 diabetes mellitus (T2DM) is complex and constantly evolving, and real-world evidence of prescribing patterns is limited. The objectives of this study were to characterize lines of therapy (LOTs), calculate the length of time spent on each LOT, and identify the reasons for the LOT end among patients who initiated oral semaglutide for T2DM.

Methods: This retrospective, claims-based study included commercial and Medicare Advantage adults with T2DM. Data from November 1, 2019, and June 30, 2020, were obtained from Optum Research Database. Patients with ≥ 1 claim for oral semaglutide and continuous health plan enrollment for ≥ 12 months prior to (baseline period) and ≥ 6 months following (follow-up period) the date of the first oral semaglutide claim were included. LOT 1 began on the date of the first oral semaglutide claim. The start date of any subsequent LOTs was the date of the first claim for an additional non-insulin anti-diabetic drug class or a reduction in drug class with use of commitment medications. The LOT ended at the first instance of medication class discontinuation, change in regimen or end of follow-up.

Results: Of the 1937 patients who initiated oral semaglutide, 950 (49.0%) remained on their initial regimen over the 6-month follow-up period, 844 (43.6%) had at least one subsequent LOT, and 89 (4.6%) had at least two subsequent LOTs. Among patients with more than one LOT, approximately 20%–25% used oral semaglutide as monotherapy or combination therapy during LOTs 2 and 3. Metformin was frequently used during treatment across all LOTs.

Conclusion: This study provides insight for physicians and payers into the real-world prescribing practices within the first 6 months following oral semaglutide initiation and fills the gap in understanding the frequency of regimen changes in the constantly evolving and complex environment of T2DM care.]

Tirzepatide 5, 10 and 15 mg versus injectable semaglutide 0.5 mg for the treatment of type 2 diabetes: An adjusted indirect treatment comparison

Zaheer H, Zaheer M.H. *Diabetes Research and Clinical Practice* 2024, 213: 111759.

[I am writing to express my concerns regarding the study “tirzepatide 5, 10 and 15 mg versus injectable semaglutide 0.5 mg for the treatment of type 2 diabetes: An adjusted indirect treatment comparison” by osumili et al [1]. While the study provides valuable insights into the efficacy and safety of tirzepatide and semaglutide, there are several limitations and potential biases that need to be addressed from a holistic perspective.]

Tirzepatide use and the risk of cancer among individuals with type 2 diabetes mellitus: A meta-analysis of randomized controlled trials

Popovic D.S., Patoulas D, Popovic L.S., et al. *Diabetes Research and Clinical Practice* 2024, 213: 111758.

[**Background:** Tirzepatide has recently been approved for the treatment of type 2 diabetes mellitus (T2DM), based on its impressive effects on glycemia and body weight reduction. We investigated whether tirzepatide affects the risk for cancer in T2DM.]

Use of Tirzepatide in Adults with Type 2 Diabetes Mellitus: Scientific Evidence and Practical Aspects

Vázquez L.A., Tofé-Povedano S, Bellido-Guerrero D, et al. *Diabetes Therapy* 2024, 15(7): 1501–1512.

[Tirzepatide is a novel antidiabetic medication a single-molecule, agonist to the glucose-dependent insulinotropic polypeptide and glucagon-like peptide-1 receptors. It is approved in the USA and EU for the treatment of type 2 diabetes mellitus (T2DM) and obesity. Due to the potential novelty represented by incorporating tirzepatide to clinical practice, we aim to review practical aspects of tirzepatide use in T2DM and the supporting scientific evidence. A group of ten endocrinologists involved as investigators

in the phase 3 SURPASS clinical trial program followed a nominal group technique, a qualitative research methodology designed as a semi-structured group discussion to reach a consensus on the selection of a set of practical aspects. The scientific evidence for tirzepatide has been reviewed with respect to a number of patients' clinical profiles and care goals. Information of interest related to adverse events, special warnings and precautions, and other considerations for tirzepatide use has been included. Finally, information provided to the patients has been summarized. The practical aspects reported herein may be helpful in guiding physicians in the use of tirzepatide and contribute to optimizing the management of T2DM.]

Prevention of diabetes (diet, exercise, lifestyle)

Articles

Yoga and prevention of type 2 diabetes - The Indian Prevention of Diabetes Study (IPDS)

Madhu S.V., Rao P.V., Chandalia H.B., et al. *Diabetes & Metabolic Syndrome: Clinical Research & Reviews* 2024;18(7): 103088.

[**Background:** Short term studies have reported that yoga could be beneficial in preventing diabetes. We evaluated long term effectiveness of yoga in reducing the risk of type 2 diabetes.]

