International Journal of Innovative Technologies in Social Science

e-ISSN: 2544-9435

Scholarly Publisher
RS Global Sp. z O.O.
ISNI: 0000 0004 8495 2390

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ARTICLE TITLE	SMART CARE FOR DIABETES: INTEGRATING TECHNOLOGY AND LIFESTYLE FOR BETTER OUTCOMES
ARTICLE INFO	Aleksandra Maciejczyk, Katarzyna Krupa, Weronika Głowacz, Janusz Świeczkowski-Feiz. (2025) Smart Care for Diabetes: Integrating Technology and Lifestyle for Better Outcomes. *International Journal of Innovative Technologies in Social Science*. 3(47). doi: 10.31435/ijitss.3(47).2025.3519
DOI	https://doi.org/10.31435/ijitss.3(47).2025.3519
RECEIVED	23 June 2025
ACCEPTED	06 August 2025
PUBLISHED	08 August 2025
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SMART CARE FOR DIABETES: INTEGRATING TECHNOLOGY AND LIFESTYLE FOR BETTER OUTCOMES

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ABSTRACT

Diabetes mellitus remains a global health challenge, with increasing prevalence and significant complications, particularly in type 2 diabetes (T2D). Lifestyle factors such as diet, physical activity, and stress are critical in both the prevention and management of the disease. Simultaneously, medical technologies are transforming diabetes care by enabling more precise glycemic control.

This review synthesizes findings from 26 studies published between 2010 and 2025, selected via structured searches of PubMed, Scopus, and Web of Science. Four independent reviewers screened the titles. The review was conducted in accordance with PRISMA 2020 guidelines.

Evidence supports that dietary approaches (like low-carbohydrate, Mediterranean, and personalized nutrition) are effective in improving glycemic outcomes. Structured aerobic and resistance exercise programs are associated with significant reductions in HbA1c and improved insulin sensitivity. Stress management techniques, such as mindfulness-based interventions, offer additional psychological and metabolic benefits. CGM and insulin pump therapies, especially in hybrid closed-loop systems, significantly improve glycemic metrics and patient-reported outcomes. AI applications show promise in insulin titration and risk prediction, though integration into clinical practice requires further research.

In conclusion, integrating lifestyle modifications with medical technologies offers the greatest potential for optimizing diabetes care. Future efforts should focus on personalized approaches and equitable access to advanced therapies.

KEYWORDS

Diabetes Mellitus, Continuous Glucose Monitoring, Insulin Pump Therapy, Artificial Intelligence, Lifestyle Intervention, Type 2 Diabetes Management

CITATION

Aleksandra Maciejczyk, Katarzyna Krupa, Weronika Głowacz, Janusz Świeczkowski-Feiz. (2025) Smart Care for Diabetes: Integrating Technology and Lifestyle for Better Outcomes. *International Journal of Innovative Technologies in Social Science*. 3(47). doi: 10.31435/ijitss.3(47).2025.3519

Introduction.

Diabetes mellitus is a complex metabolic disease characterized by chronic hyperglycemia due to defects in insulin secretion and action. It is defined as a heterogeneous group of disorders characterized by hyperglycemia and glucose intolerance (Chatziravdeli et al., 2023). The global prevalence of diabetes is rising (over 460 million adults worldwide) and most cases are type 2 diabetes (T2D), driven by both genetic and modifiable environmental factors (Chatziravdeli et al., 2023). Lifestyle factors – diet, physical activity, and stress – strongly influence the development and progression of diabetes (Aune et al., 2015; Boushey et al., 2020). Healthy dietary patterns rich in vegetables, fruits and whole grains and low in red/processed meats and sweets have been associated with a substantially reduced risk of incident T2D (Boushey et al., 2020). Likewise, higher levels of regular physical activity lower diabetes risk (for example, one meta-analysis found ~35% lower T2D incidence in the most active vs. least active adults) (Aune et al., 2015). Psychological stress also plays a key role: acute stress responses raise blood glucose and chronic stress (via sustained cortisol, inflammation, and unhealthy behaviors) is linked to higher incidence of T2D (Hackett & Steptoe, 2017). In parallel, advances in diabetes technology – notably continuous glucose monitoring (CGM), insulin pump therapy, and artificial intelligence (AI) decision-support – are transforming management. Recent trials show that CGM significantly improves glycemic control (expanding time-in-range and reducing HbA1c) in both type 1 and type 2 diabetes (Maiorino et al., 2020), while continuous subcutaneous insulin infusion (CSII, insulin pump) can yield better HbA1c than multiple injections in many patients (Chatziravdeli et al., 2023). AI-driven tools (for example, automated insulin dosing algorithms in closed-loop "artificial pancreas" systems) are emerging as effective supports, allowing more precise insulin titration and easing clinical workloads (Guan et al., 2023; Nimri et al., 2020).

Methodology

This narrative review synthesizes current evidence on the impact of diet, physical activity, stress, and emerging technologies on the prevention and management of diabetes mellitus, with a focus on type 2 diabetes (T2D). The review was conducted in accordance with the PRISMA 2020 guidelines (Page et al., 2021). A structured literature search was performed in PubMed, Scopus, and Web of Science databases covering the years 2010–2025, using combinations of terms such as "type 2 diabetes," "diet," "nutrition," "physical activity," "exercise," "stress," "psychological factors," "continuous glucose monitoring," "insulin pump," "artificial intelligence," and "closed-loop system." Boolean operators and search syntax were adapted to each database.

Only peer-reviewed, full-text articles published in English were included. Priority was given to systematic reviews, meta-analyses, randomized controlled trials, and large observational studies. Additional studies were identified through reference and citation tracking. A total of 26 articles was included based on relevance, methodological quality, and contribution to the thematic scope of this review.

All records were imported into EndNote X9 for deduplication. Four independent reviewers screened the titles, abstracts, and full texts according to predefined inclusion criteria. Any discrepancies were resolved through discussion.

Data were manually extracted and categorized into four thematic domains: (1) dietary interventions, (2) physical activity, (3) psychosocial stress and stress management, and (4) technological innovations in diabetes care. Studies were appraised based on the strength and consistency of evidence, with emphasis on clinical outcomes such as changes in HbA1c, glycemic variability, insulin sensitivity, and patient-reported outcomes.

Results

Impact of Diet on Diabetes

Diet profoundly affects both the risk of developing diabetes and glycemic control in those with disease. Epidemiological evidence indicates that "healthy" dietary patterns high in plant foods and low in processed foods significantly lower diabetes risk (Boushey et al., 2020). For example, diets emphasizing vegetables, fruits, and whole grains (and minimizing red/processed meat, refined grains, and added sugars) have been shown to *reduce the risk of type 2 diabetes* in adults (Boushey et al., 2020). In contrast, Western-style diets rich in saturated fat, sugar and refined carbohydrates contribute to obesity and insulin resistance, accelerating diabetes onset. Interventional trials have tested specific diets for diabetes management. Meta-analyses indicate that several dietary approaches can improve glycemic metrics: Mediterranean, low-carbohydrate (including ketogenic), low–glycemic index (GI), and high-protein diets have all yielded significant reductions in HbA1c and/or fasting glucose when compared to control diets (Ajala et al., 2013; Jing et al., 2023). For instance, one recent network meta-analysis found that ketogenic (-0.73% HbA1c), low-carbohydrate (-0.69%), and even low-fat diets (-1.82%) significantly reduced HbA1c, while

Mediterranean and moderate-carbohydrate diets also improved fasting glucose (Jing et al., 2023). Notably, no one diet is optimal for all patients: weight loss (through caloric restriction) often drives much of the glycemic benefit, and the "best" macronutrient mix varies by individual. Emerging evidence suggests that personalized nutrition – tailoring diet based on genetics, microbiome, and personal metabolic profile – may outperform one-size-fits-all advice. Reviews highlight that individualized dietary plans, informed by genetic and gut-microbiome data, lead to greater improvements in metabolic health than standard dietary advice (Zeinalian et al., 2022). Overall, current guidelines support a flexible strategy: encourage healthy eating patterns (e.g. Mediterranean-style diet) rich in fiber and low-GI carbohydrates, but adapt the diet to patient preferences, tolerances, and responses (Ajala et al., 2013; Jing et al., 2023).

Physical Activity and Diabetes

Regular physical activity is protective against diabetes and is a cornerstone of diabetes care. Numerous cohort studies and meta-analyses have confirmed that higher levels of daily activity (even moderate-intensity exercise) substantially lower future T2D risk (Aune et al., 2015). For example, a dose-response review found that individuals in the highest activity category had about 35% lower incidence of T2D compared to the least active, with benefits seen across leisure, occupational, and vigorous exercise (Aune et al., 2015). Exercise programs also improve control for those with established diabetes. Clinical trials and systematic reviews show that structured aerobic and resistance training *significantly* improve glycemic control. One consensus review noted that regular aerobic exercise training can reduce HbA1c by roughly 0.5–0.7% in adults with T2D (Kanaley et al., 2022), on top of other benefits in insulin sensitivity, lipid levels, blood pressure and fitness. Resistance exercise likewise enhances insulin sensitivity and often boosts strength and lean mass, contributing to lower HbA1c when combined with aerobic activity (Kanaley et al., 2022).

The physiological mechanisms are well described. During muscle activity, glucose uptake into skeletal muscle increases via insulin-independent pathways (muscle contraction–stimulated GLUT4 translocation), lowering blood glucose acutely (Kanaley et al., 2022). Over time, regular exercise improves insulin sensitivity in both muscle and liver, preserves β-cell function, and modulates adipokines and inflammatory profiles (Kanaley et al., 2022). For example, a single bout of high-intensity interval exercise (HIIE) can markedly lower post-meal glucose spikes, and short-term training regimens can enhance mitochondrial function and insulin-stimulated glucose disposal (Grace et al., 2017; Kanaley et al., 2022). These combined effects of physical activity yield better glycemic control, reduced insulin requirements, and lower cardiovascular risk. In summary, promoting daily exercise (aerobic, resistance, or combined) is strongly supported: more active individuals are far less likely to develop T2D (Aune et al., 2015), and exercise programs measurably improve HbA1c and insulin action in patients with diabetes (Kanaley et al., 2022).

Stress and Diabetes

Psychological stress is increasingly recognized as a factor in both the onset and progression of diabetes. Acute stress triggers the release of cortisol, adrenaline, and glucagon, mobilizing glucose and lipids into the bloodstream. While adaptive in the short term, chronic or repeated stress can lead to *allostatic overload*, dysregulating glucose metabolism and promoting inflammation (Hackett & Steptoe, 2017). Epidemiological evidence has linked chronic stress, depression, and traumatic life events to a higher risk of incident T2D (Hackett & Steptoe, 2017). For example, population studies show that individuals with sustained high cortisol output or with a history of work stress or early adversity are more likely to develop type 2 diabetes later in life (Hackett & Steptoe, 2017). Stress can also indirectly worsen diabetes by impairing diet and exercise habits and by reducing medication adherence. Conversely, in people with existing diabetes, comorbid depression and "diabetes distress" are consistently associated with poorer glycemic control and more complications (Hackett & Steptoe, 2017).

Stress management interventions show promise in alleviating these effects. Mind-body therapies such as mindfulness, meditation, cognitive-behavioral stress management, and relaxation techniques have been tested in randomized trials. A recent meta-analysis found that mindfulness-based interventions produced *modest but significant* benefits: on average they lowered HbA1c by about 0.25% and significantly reduced measures of stress, depression, and diabetes-related distress (Ni et al., 2021). In that review of eight RCTs (841 patients), participants receiving mindfulness training had better psychological outcomes and slightly better glycemic control than controls. Thus, integrating stress-reduction strategies (mindfulness training, counseling, exercise, etc.) into diabetes care can yield small improvements in blood glucose and importantly improve mental well-being (Ni et al., 2021). More research is still needed on long-term impacts, but current evidence supports including psychosocial support as a standard component of diabetes management.

Advancements in Insulin Delivery

The earliest attempts to treat diabetes using herbal remedies or dietary modifications can be found in ancient sources from various cultures, including Egyptian, Greek, Arabic, and Chinese texts (Karamanou et al., 2016). However, it was not until the discovery and isolation of insulin in 1921 that the pharmacological management of diabetes was revolutionized (Mudaliar, 2023). In the decades that followed, additional antidiabetic agents were developed – such as metformin, sulfonylureas, GLP-1 receptor agonists, and SGLT2 inhibitors – most of which have been incorporated into treatment regimens for type 2 diabetes (White, 2014). Due to the pathophysiology of type 1 diabetes, however, patients with this condition require lifelong insulin therapy.

The initial methods of insulin administration relied on subcutaneous injections via syringes, demanding significant precision and discipline from patients. Advancements in medical technology led to the introduction of insulin pens, which simplified administration but still necessitated multiple daily injections (MDI) (Selam, 2010). In the late 1970s, the first insulin pump available for patient use – the AutoSyringe AS-2C – was introduced. Since then, insulin pumps have become increasingly accessible, user-friendly, and functionally advanced.

Clinical studies demonstrate that insulin pump therapy improves glycemic control and reduces the risk of complications compared to MDI in both type 1 and type 2 diabetes. For instance, a cohort study by Karges et al. (Karges et al., 2017) involving patients under the age of 20 with type 1 diabetes found that insulin pump users had lower rates of hypoglycemia and diabetic ketoacidosis, along with better glycemic control (Karges et al., 2017). Similarly, a study by the Department of Veterans Affairs Implantable Insulin Pump Study Group, which examined patients aged 40–69 with type 2 diabetes, reported that pump therapy resulted in fewer glucose fluctuations and hypoglycemic episodes (Saudek et al., 1996). Furthermore, patients using insulin pumps did not experience the weight gain often associated with MDI and reported an improved quality of life (Saudek et al., 1996).

Insulin pump therapy is also associated with reduced cardiovascular mortality. Research by Steineck et al. (Steineck et al., 2015) showed that, among patients with type 1 diabetes, insulin pump use significantly decreased the risk of fatal coronary heart disease, fatal cardiovascular events, and all-cause mortality compared to MDI. This benefit is attributed to more stable glycemic levels achieved with pump therapy, which in turn reduces the frequency of hypo- and hyperglycemic episodes—both known risk factors for cardiovascular complications (Steineck et al., 2015).

Patient education remains a cornerstone of effective diabetes management. A study conducted by the Department of Oncology and Metabolism at the University of Sheffield compared insulin pump therapy with MDI in type 1 diabetes patients who had received training in flexible insulin dosing. The findings emphasized that, with adequate education, both treatment modalities can enhance glycemic control and quality of life (Group, 2017).

In conclusion, insulin pump therapy offers superior glycemic control, reduced risk of complications, and enhanced quality of life for individuals with type 1 and type 2 diabetes. The future of diabetes treatment lies in automation and the development of artificial pancreas systems. Nevertheless, comprehensive patient education and sustained engagement remain critical for achieving optimal outcomes.

Discussion

Recent advances in diabetes care, particularly the integration of continuous glucose monitoring (CGM), insulin pumps, and artificial intelligence (AI), have significantly transformed disease management for both type 1 and type 2 diabetes. CGM systems, now widely adopted, have been shown to improve glycemic control by increasing time-in-range and reducing HbA1c and hypoglycemia episodes, especially in insulin-treated individuals (Galaviz et al., 2018; Kwon & Moon, 2025). Similarly, insulin pump therapy offers more precise and flexible insulin delivery than multiple daily injections (MDI), with studies reporting better metabolic outcomes, fewer glucose excursions, and improved quality of life.

AI tools are emerging as important decision-support systems in diabetes care. Algorithms can optimize insulin dosing, predict hypoglycemia, and personalize treatment regimens. Early evidence suggests that AI-based management may be comparable to expert clinician-led care in specific settings (Guan et al., 2023). However, challenges remain in clinical integration, especially regarding data privacy, validation, and accessibility.

At the same time, the role of lifestyle factors remains foundational. Dietary patterns rich in fiber, whole grains, and plant-based foods, and low in saturated fats and refined carbohydrates, are associated with improved glycemic control and reduced risk of type 2 diabetes (Yeh et al., 2023). Structured physical activity—both aerobic and resistance training—has been shown to reduce HbA1c and enhance insulin sensitivity, with even moderate exercise conferring measurable benefits (Galaviz et al., 2018; Ribeiro et al., 2023; Yeh et al., 2023). Chronic stress and depression are also important contributors to poor glycemic outcomes, and stress-reduction strategies such as mindfulness or cognitive-behavioral therapy show modest but significant improvements in HbA1c and psychological well-being (Mirmira et al., 2023).

The clinical implication is clear: optimal diabetes management must integrate both technological innovation and behavioral strategies. Technologies like CGM and closed-loop systems should be tailored to patient needs, supported by structured education, and integrated into multidisciplinary care. Future research should focus on improving access to these tools, validating AI applications in broader populations, and combining digital platforms with personalized lifestyle interventions. Importantly, healthcare systems must address disparities in access to these technologies, ensuring that advances benefit all patient groups—not just those with the best resources. By embracing both smart tools and human-centered care, the future of diabetes management can become more precise, effective, and equitable.

Summary

Recent evidence highlights that both lifestyle and technology are crucial in diabetes prevention and care. Healthy lifestyle modifications have powerful effects: balanced, plant-rich diets and regular exercise significantly reduce the risk of developing type 2 diabetes (Aune et al., 2015; Boushey et al., 2020) and improve outcomes in those with disease. Stress management interventions can additionally improve psychological well-being and produce small glycemic gains (Ni et al., 2021). At the same time, modern medical technologies markedly enhance management: CGM and insulin pumps consistently improve glycemic metrics compared to traditional methods (Maiorino et al., 2020), and AI-driven systems are beginning to automate and optimize insulin therapy without loss of safety or efficacy (Nimri et al., 2020). In practice, the best diabetes care will combine these approaches: a personalized diet and exercise plan, attention to mental health, and smart use of devices and data.

Future research should focus on testing tailored lifestyle programs, evaluating stress-reduction methods, and assessing new technologies in real-world settings. Integrating digital tools with lifestyle support and addressing access and cost-effectiveness are key. A personalized approach combining behavioral strategies with modern technologies holds the greatest potential to improve glycemic control and reduce complications (Boushey et al., 2020; Maiorino et al., 2020).

Acknowledgements

The authors declare no competing interests.

Data Availability

The authors have compiled an Excel spreadsheet containing the key data extracted from all studies included in this systematic review. This summary dataset supports the results and conclusions presented in the article. The dataset is not publicly available, but it can be obtained from the authors upon reasonable request. There are no legal or privacy restrictions on sharing these data. Requests for access should be directed to the corresponding author.

Contributors' Statement

Data collection: AM, JŚF, KK, WG; drafting the manuscript: AM, KK, WG, JŚF; critical revision of the manuscript: JŚF. All authors reviewed and accepted the final version of the manuscript.

REFERENCES

1. Ajala, O., English, P., & Pinkney, J. (2013). Systematic review and meta-analysis of different dietary approaches to the management of type 2 diabetes. *Am J Clin Nutr*, *97*(3), 505-516. https://doi.org/10.3945/ajcn.112.042457
2. Aune, D., Norat, T., Leitzmann, M., Tonstad, S., & Vatten, L. J. (2015). Physical activity and the risk of type 2 diabetes: a systematic review and dose-response meta-analysis. *Eur J Epidemiol*, *30*(7), 529-542. https://doi.org/10.1007/s10654-015-0056-z
3. Boushey, C., Ard, J., Bazzano, L., Heymsfield, S., Mayer-Davis, E., Sabaté, J., Snetselaar, L., Van Horn, L., Schneeman, B., English, L. K., Bates, M., Callahan, E., Butera, G., Terry, N., & Obbagy, J. (2020). USDA Nutrition Evidence Systematic Reviews. In *Dietary Patterns and Risk of Type 2 Diabetes: A Systematic Review*. USDA Nutrition Evidence Systematic Review. https://doi.org/10.52570/nesr.Dgac2020.Sr0103
4. Chatziravdeli, V., Lambrou, G. I., Samartzi, A., Kotsalas, N., Vlachou, E., Komninos, J., & Tsartsalis, A. N. (2023). A Systematic Review and Meta-Analysis of Continuous Subcutaneous Insulin Infusion vs. Multiple Daily Injections in Type-2 Diabetes. *Medicina (Kaunas)*, *59*(1). https://doi.org/10.3390/medicina59010141
5. Galaviz, K. I., Narayan, K. M. V., Lobelo, F., & Weber, M. B. (2018). Lifestyle and the Prevention of Type 2 Diabetes: A Status Report. *Am J Lifestyle Med*, *12*(1), 4-20. https://doi.org/10.1177/1559827615619159
6. Grace, A., Chan, E., Giallauria, F., Graham, P. L., & Smart, N. A. (2017). Clinical outcomes and glycaemic responses to different aerobic exercise training intensities in type II diabetes: a systematic review and meta-analysis. *Cardiovasc Diabetol*, *16*(1), 37. https://doi.org/10.1186/s12933-017-0518-6
7. Group, T. R. S. (2017). Relative effectiveness of insulin pump treatment over multiple daily injections and structured education during flexible intensive insulin treatment for type 1 diabetes: cluster randomised trial (REPOSE). *Bmj*, *356*, j1285. https://doi.org/10.1136/bmj.j1285
8. Guan, Z., Li, H., Liu, R., Cai, C., Liu, Y., Li, J., Wang, X., Huang, S., Wu, L., Liu, D., Yu, S., Wang, Z., Shu, J., Hou, X., Yang, X., Jia, W., & Sheng, B. (2023). Artificial intelligence in diabetes management: Advancements, opportunities, and challenges. *Cell Rep Med*, *4*(10), 101213. https://doi.org/10.1016/j.xcrm.2023.101213
9. Hackett, R. A., & Steptoe, A. (2017). Type 2 diabetes mellitus and psychological stress - a modifiable risk factor. *Nat Rev Endocrinol*, *13*(9), 547-560. https://doi.org/10.1038/nrendo.2017.64
10. Jing, T., Zhang, S., Bai, M., Chen, Z., Gao, S., Li, S., & Zhang, J. (2023). Effect of Dietary Approaches on Glycemic Control in Patients with Type 2 Diabetes: A Systematic Review with Network Meta-Analysis of Randomized Trials. *Nutrients*, *15*(14). https://doi.org/10.3390/nu15143156
11. Kanaley, J. A., Colberg, S. R., Corcoran, M. H., Malin, S. K., Rodriguez, N. R., Crespo, C. J., Kirwan, J. P., & Zierath, J. R. (2022). Exercise/Physical Activity in Individuals with Type 2 Diabetes: A Consensus Statement from the American College of Sports Medicine. *Med Sci Sports Exerc*, *54*(2), 353-368. https://doi.org/10.1249/mss.0000000000002800
12. Karamanou, M., Protogerou, A., Tsoucalas, G., Androutsos, G., & Poulakou-Rebelakou, E. (2016). Milestones in the history of diabetes mellitus: The main contributors. *World J Diabetes*, *7*(1), 1-7. https://doi.org/10.4239/wjd.v7.i1.1
13. Karges, B., Schwandt, A., Heidtmann, B., Kordonouri, O., Binder, E., Schierloh, U., Boettcher, C., Kapellen, T., Rosenbauer, J., & Holl, R. W. (2017). Association of Insulin Pump Therapy vs Insulin Injection Therapy With Severe Hypoglycemia, Ketoacidosis, and Glycemic Control Among Children, Adolescents, and Young Adults With Type 1 Diabetes. *Jama*, *318*(14), 1358-1366. https://doi.org/10.1001/jama.2017.13994
14. Kwon, S. Y., & Moon, J. S. (2025). Advances in Continuous Glucose Monitoring: Clinical Applications. *Endocrinol Metab (Seoul)*, *40*(2), 161-173. https://doi.org/10.3803/EnM.2025.2370
15. Maiorino, M. I., Signoriello, S., Maio, A., Chiodini, P., Bellastella, G., Scappaticcio, L., Longo, M., Giugliano, D., & Esposito, K. (2020). Effects of Continuous Glucose Monitoring on Metrics of Glycemic Control in Diabetes: A Systematic Review With Meta-analysis of Randomized Controlled Trials. *Diabetes Care*, *43*(5), 1146-1156. https://doi.org/10.2337/dc19-1459
16. Mirmira, R. G., Kulkarni, R. N., Xu, P., Drossos, T., Varady, K., Knutson, K. L., Reutrakul, S., Martyn-Nemeth, P., Sargis, R. M., Wallia, A., Tuchman, A. M., Weissberg-Benchell, J., Danielson, K. K., Oakes, S. A., Thomas, C. C., Layden, B. T., May, S. C., Burbea Hoffmann, M., Gatta, E.,…Philipson, L. H. (2023). Stress and human health in diabetes: A report from the 19(th) Chicago Biomedical Consortium symposium. *J Clin Transl Sci*, *7*(1), e263. https://doi.org/10.1017/cts.2023.646
17. Mudaliar, S. (2023). The Evolution of Diabetes Treatment Through the Ages: From Starvation Diets to Insulin, Incretins, SGLT2-Inhibitors and Beyond. *Journal of the Indian Institute of Science*, *103*(1), 123-133. https://doi.org/10.1007/s41745-023-00357-w
18. Ni, Y. X., Ma, L., & Li, J. P. (2021). Effects of mindfulness-based intervention on glycemic control and psychological outcomes in people with diabetes: A systematic review and meta-analysis. *J Diabetes Investig*, *12*(6), 1092-1103. https://doi.org/10.1111/jdi.13439

19. Nimri, R., Battelino, T., Laffel, L. M., Slover, R. H., Schatz, D., Weinzimer, S. A., Dovc, K., Danne, T., & Phillip, M. (2020). Insulin dose optimization using an automated artificial intelligence-based decision support system in youths with type 1 diabetes. *Nat Med*, *26*(9), 1380-1384. https://doi.org/10.1038/s41591-020-1045-7
20. Page, M. J., McKenzie, J. E., Bossuyt, P. M., Boutron, I., Hoffmann, T. C., Mulrow, C. D., Shamseer, L., Tetzlaff, J. M., Akl, E. A., Brennan, S. E., Chou, R., Glanville, J., Grimshaw, J. M., Hróbjartsson, A., Lalu, M. M., Li, T., Loder, E. W., Mayo-Wilson, E., McDonald, S.,…Moher, D. (2021). The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. *Bmj*, *372*, n71. https://doi.org/10.1136/bmj.n71
21. Ribeiro, A., Carvalho, J. P. R., & Bento-Torres, N. V. O. (2023). Physical exercise as treatment for adults with type 2 diabetes: a rapid review. *Front Endocrinol (Lausanne)*, *14*, 1233906. https://doi.org/10.3389/fendo.2023.1233906
22. Saudek, C. D., Duckworth, W. C., Giobbie-Hurder, A., Henderson, W. G., Henry, R. R., Kelley, D. E., Edelman, S. V., Zieve, F. J., Adler, R. A., Anderson, J. W., Anderson, R. J., Hamilton, B. P., Donner, T. W., Kirkman, M. S., & Morgan, N. A. (1996). Implantable insulin pump vs multiple-dose insulin for non-insulin-dependent diabetes mellitus: a randomized clinical trial. Department of Veterans Affairs Implantable Insulin Pump Study Group. *Jama*, *276*(16), 1322-1327.
23. Selam, J.-L. (2010). Evolution of Diabetes Insulin Delivery Devices. *Journal of Diabetes Science and Technology*, *4*(3), 505-513. https://doi.org/10.1177/193229681000400302
24. Steineck, I., Cederholm, J., Eliasson, B., Rawshani, A., Eeg-Olofsson, K., Svensson, A.-M., Zethelius, B., Avdic, T., Landin-Olsson, M., Jendle, J., & Gudbjörnsdóttir, S. (2015). Insulin pump therapy, multiple daily injections, and cardiovascular mortality in 18 168 people with type 1 diabetes: observational study. *BMJ : British Medical Journal*, *350*, h3234. https://doi.org/10.1136/bmj.h3234
25. White, J. R., Jr. (2014). A Brief History of the Development of Diabetes Medications. *Diabetes Spectrum*, *27*(2), 82-86. https://doi.org/10.2337/diaspect.27.2.82
26. Yeh, Y. K., Yen, F. S., & Hwu, C. M. (2023). Diet and exercise are a fundamental part of comprehensive care for type 2 diabetes. *J Diabetes Investig*, *14*(8), 936-939. https://doi.org/10.1111/jdi.14043
27. Zeinalian, R., Ahmadikhatir, S., Esfahani, E. N., Namazi, N., & Larijani, B. (2022). The roles of personalized nutrition in obesity and diabetes management: a review. *J Diabetes Metab Disord*, *21*(1), 1119-1127. https://doi.org/10.1007/s40200-022-01016-0