

TDC Newsletter Featuring Diabetes Research & Developments



The Diabetes Centre and Health Services Academy Join Forces for Healthcare Advancement

Dear Readers,

We are delighted to share a momentous development in the healthcare landscape as The Diabetes Centre (TDC) and Health Services Academy (HSA) formally enter into a Memorandum of Understanding (MOU). This strategic collaboration marks a significant step towards fostering excellence in healthcare education, innovation, research, and training.



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Under this MOU, TDC and HSA will introduce new programs and diplomas designed to address the evolving needs of the healthcare sector. The curriculum will be developed and delivered by a team of seasoned doctors and professionals affiliated with The Diabetes Centre. This collaborative effort aims to equip healthcare professionals with the latest insights, tools, and skills necessary to navigate the complexities of modern healthcare.

The combined strengths of The Diabetes Centre and Health Services Academy will undoubtedly create a platform for transformative advancements in the healthcare landscape.

We express our sincere enthusiasm for the opportunities that lie ahead and extend our gratitude to all stakeholders who have played a role in making this collaboration a reality. Together, we are poised to make enduring contributions to healthcare education, innovation, and research, ultimately impacting the quality of healthcare services provided to our community.

Featured Research

Revolutionizing Weight Loss: GLP-1 Receptor Agonists Named Breakthrough of the Year

In the arid landscapes of the southwestern U.S., an unlikely hero emerges from the shadows—the Gila monster, a lizard known for its formidable bite and potent venom. However, it is within the unassuming mouth of this creature that scientists discovered a groundbreaking chemical, leading to the development of the first glucagon-like peptide-1 (GLP-1) mimic. Honored as this year's Science Breakthrough of the Year, GLP-1 receptor agonists are transforming the landscape of weight loss therapies.

Initially recognized as a gut hormone, GLP-1 exerts its influence on organs throughout the body, playing crucial roles in regulating blood sugar. This discovery paved the way for the development of drugs that mimic its effects by activating the GLP-1 receptor—termed GLP-1 receptor agonists.

Notably, individuals taking these drugs experienced weight loss, prompting the U.S. FDA to approve one of them for treating obesity in 2014. The real breakthrough, however, came with the development of a weekly dosage option, propelling GLP-1 receptor agonists into the spotlight as effective weight loss drugs.

Historically, weight loss drugs faced skepticism and challenges due to societal misconceptions about obesity and the difficulty in developing safe and beneficial medications. This year's breakthrough acknowledges the transformative impact of GLP-1 receptor agonists, reshaping not only obesity treatment but also our understanding of it as a chronic illness rooted in biology, not mere willpower failure.

Unlike their predecessors, GLP-1 receptor agonists demonstrate high effectiveness with generally limited and manageable side effects. Clinical trials indicate improvements in heart health and kidney disease for individuals with obesity or diabetes, with ongoing investigations exploring their potential in addressing drug addiction and other conditions. However, concerns about cost and the potential lifelong need for these drugs linger. We acknowledge the uncertainties these drugs may bring and recognize the complexities of obesity as a medical and social issue.

Study Reveals Link Between Increased Body and Abdominal Fat and Insulin Resistance in Teenagers, Elevating Type 2 Diabetes Risk

In a study conducted by the University of Bristol's Children of the 90's cohort, also known as the Avon Longitudinal Study of Parents and Children, researchers have uncovered a concerning association between elevated body and abdominal fat in adolescence and the development of insulin resistance. The findings highlight the critical role of maintaining a healthy body composition during the formative years to mitigate the risk of type 2 diabetes.

Childhood and adolescent obesity represent a global health challenge, with long-term consequences for cardiovascular, neurological, and musculoskeletal health, as well as an increased risk of type 2 diabetes in adulthood. Traditional measures of obesity, such as Body Mass Index (BMI), fail to distinguish between muscle mass and fat mass, leading to a need for more accurate assessments in younger populations.

The study, spanning nine years and including 3,160 adolescents, revealed that each 1 kg cumulative increase in total body fat mass from mid-adolescence through young adulthood raised the risk of hyperglycemia, hyperinsulinemia, and insulin

resistance by 4%, 9%, and 12%, respectively. The effects were even more pronounced for abdominal fat, with a 7%, 13%, and 21% increase in the respective risks for each 1 kg increase.

Remarkably, a higher muscle mass exhibited a protective effect, reducing the risk of both hyperinsulinemia and insulin resistance by 2% for each 1 kg increase. This underlines the importance of not only managing fat mass but also promoting muscle development to counteract insulin resistance.

The study further unveiled a disheartening cycle, wherein a high total body fat mass at age 15 led to increased insulin resistance at age 17, and vice versa. This cycle persisted into young adulthood, emphasizing the urgency of preventive measures during adolescence.

The study's results were consistent across genders and independent of BMI, emphasizing the broad relevance of the findings. Dr. Agbaje stressed the need for preventive strategies, asserting that weight gain prevention is crucial to breaking the fat mass-insulin resistance cycle.

These findings underscore the importance of holistic interventions, including lifestyle modifications, to curb the rising tide of type 2 diabetes among the youth population.

Early Diabetes Detection Breakthrough: A Mathematical Solution Unveiled

In the realm of diabetes diagnosis, the challenge of timely detection has long persisted, often leading to severe organ or nerve damage before the condition is identified. The intricacies involved in early-stage diagnosis have prompted an international research team, led by Associate Professor Dr. Johannes Dietrich from the Department of Medicine I at Ruhr University Bochum, to develop a groundbreaking solution. Published in the esteemed *Journal of Diabetes*, the researchers introduce a new mathematical calculation, SPINA Carb, capable of offering a reliable and cost-effective diagnosis of diabetes at an early stage. This innovative method hinges on just two values derived from a morning blood sample – insulin and glucose.

Dr. Johannes Dietrich emphasizes the urgency of this breakthrough, stating, "Thirty percent of all people with diabetes remain undiagnosed, depriving them of vital treatment." This lack of detection arises from the gradual onset of diabetes and the limitations of existing diagnostic tools, which are neither sensitive nor specific enough, leading to potential false positive results.

The SPINA Carb method utilizes a mathematical model to process insulin and glucose values, yielding a static disposition index (SPINA-DI). In computer simulations, the research team validated the method's effectiveness, confirming the theory of dynamical compensation. This theory posits that pancreatic beta cells increase activity to compensate for insulin resistance in individuals with metabolic syndrome.

Further validating the SPINA-DI, a study involving volunteers from the U.S., Germany, and India demonstrated strong correlations with key indicators of metabolic function, such as responses to an oral glucose tolerance test. Remarkably, SPINA-DI surpassed other calculated markers in accuracy, providing a more reliable and precise diagnosis.

"The new method is not only cost-effective but also precise and reliable," conclude the authors, suggesting that it has the potential to complement or even replace existing, more complex diagnostic methods. This breakthrough holds promise for early intervention and treatment, reducing the impact of diabetes on individuals' health and well-being.

Interesting Case Report Latent Autoimmune Diabetes in Adults (LADA) – A Clinical Insight

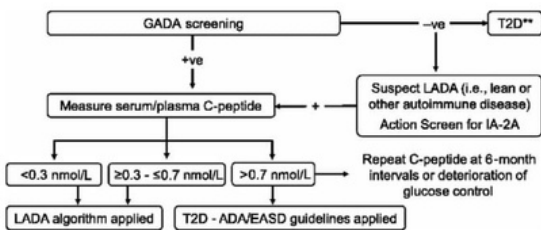
Clinical Presentation: A 56-year-old female presented at The Diabetes Centre Lahore with hyperglycemia. Initially diagnosed as prediabetic, she was started on baseline therapy involving metformin, lifestyle modifications, and medical nutrition therapy. With good compliance, her HbA1c stabilized at 6.8%. However, subsequent visits on October 10th, 16th, and 20th, 2023, revealed hyperglycemic states accompanied by excessive thirst, increased frequency of urination, weakness, and epigastric pain.

Clinical Course: Medications were revised, and the patient underwent counseling with requests for FBS, fasting insulin, C-peptide, and TSH tests. Four days later, on October 24th, 2023, she presented at the ER with dehydration and weakness. A comprehensive lab workup revealed the diagnosis of Latent Autoimmune Diabetes in Adults (LADA).

LADA Recognition and Characteristics: While the American Diabetes Association (ADA) categorizes LADA as a form of Type 1 diabetes that evolves more slowly, the World Health Organization (WHO) terms it as slowly evolving immune-related diabetes. Metabolic syndrome features are observed in LADA subsets with lower

antibody titers and higher BMI, suggesting a milder autoimmune process and slower beta cell failure progression.

LADA diagnostic pathway based on autoantibody screening



Algorithm for LADA diagnostic pathway based on autoantibody screening and C-peptide levels at diagnosis (to be used when financial restriction does not apply). **Consider also pancreatitis or monogenic diabetes.

Characteristics of slowly evolving immune-related diabetes include age over 30, a family history of autoimmunity, a gradual decrease in C-peptide levels compared to Type 1 diabetes, and non-insulin requirement at disease onset. Treatment options range from insulin to various oral medications, immune interventions, and lifestyle modifications. However, insulin remains the preferred choice.

Clinical Implications and Importance of Early Diagnosis:

This case underscores the significance of clinically recognizing slowly evolving immune-related diabetes and implementing screening diagnostic tests, especially for patients deviating from the typical Type 2 diabetes profile. Early diagnosis correlates with better glycemic control, potentially reducing the risk of long-term complications

Recommendations and Conclusion: Autoantibody testing should be emphasized for obtaining a definitive diagnosis, especially in those patients where sudden hypos and hyperglycemic states are being reported in ER. Clinicians should consider diabetes sub types also in diagnosis, particularly in cases where the clinical presentation does not align with traditional Type 2 diabetes profiles.

In conclusion, this case report highlights the complexities of LADA, reinforcing the need for a nuanced approach in diabetes diagnosis and treatment. By staying vigilant to atypical presentations, healthcare professionals can enhance patient outcomes and contribute to the evolving understanding of diabetes subtypes.

Educational Resources

Diabetes Standards of Care

Health care providers can stay up-to-date on the latest Standards of Diabetes Care to ensure their patients are receiving timely, equitable, and high-quality care.

Your patients manage their diabetes care with regular guidance and support from their health care team. At every health care visit, you and other care team members can encourage them to take their medicines and get regular care for their eyes, ears, feet, and teeth.

The 5 Actions for Health Care Teams series offers action steps and key messages for all providers:

- **How to Promote Ear Health for People With Diabetes**
- **How to Promote Eye Health for People With Diabetes**
- **How to Promote Foot Health for People With Diabetes**
- **How to Promote Medication Management for People With Diabetes**
- **How to Promote Oral Health for People With Diabetes**

As a health care provider, you know firsthand that these actions are key to preventing complications and enhancing quality of life for people with diabetes. Living successfully with diabetes means developing the skills to self-manage outside of the clinical setting. **Diabetes self-management education and support (DSMES)** helps people learn practical skills and personalized strategies to manage diabetes in their everyday lives. DSMES provides structured support so people with diabetes can make sustainable lifestyle changes with the help of a diabetes care and education specialist. People who participate in DSMES are more likely to have better health outcomes, including lower A1C levels and fewer complications.

Collaborative Initiatives for Diabetes Research at The Diabetes Centre

We are excited to bring you updates on the projects currently underway at The Diabetes Centre, focusing on innovative research collaborations aimed at advancing our understanding of diabetes and improving patient outcomes. In this edition, we highlight two prominent projects led by dedicated professionals from various esteemed institutions in collaboration with TDC.

1. Project Title:

Identification of Risk Factors Leading to Early Onset of Diabetes Mellitus and Genetic Characterization of Monogenic Diabetes in Pakistan

Principal Investigator: Professor Muhammad Arif Nadeem Saqib

Department: Medical Laboratory Technology, National Skills University Islamabad

Co-Investigators from TDC:

- Dr. Nuzhat Hameed
Consultant Diabetologist & Family Physician
The Diabetes Centre Islamabad
- Mr. Muhammad Attique (Biochemist)

Co-Investigators:

- Dr Constantin Polychronakos, Paediatric Endocrinologist/Professor, Departments of Paediatrics and Human Genetics, McGill University, Canada
- Dr Muhammad Ansar, Professor, Department of Biochemistry, Quaid Azam University, Islamabad
- Dr Asher Fawad, Associate Professor, Baqi Institute of Diabetes and Endocrinology, Karachi
- Dr Muhammad Sohail Afzal, Associate Professor, Department of Life Sciences, UMT Lahore

Collaborators:

- Prof Abdul Basit, Professor, Baqi Institute of Diabetes and Endocrinology, Karachi; President, Pakistan Diabetic Association, Karachi
- Dr. Nighat Murad, Research Director, Pakistan Health Research Council, Head office, Islamabad
- Mr. Ibrar Rafique, Research Officer, Pakistan Health Research Council, Head office, Islamabad
- Ms. Tayyaba Rahat, Statistical Officer, Pakistan Health Research Council, Head office, Islamabad

2. Project Title:

Estimation of Prevalence and Risk Factors of Diabetes-Related Complications in Young Diabetics: Integrative Strategies for Comprehensive NCD Prevention

Principal Investigator: Professor Muhammad Arif Nadeem Saqib

Department: Medical Laboratory Technology, National Skills University Islamabad

Co-Investigators from TDC:

- Dr. Asjad Hameed
Consultant Physician in Diabetes and Endocrinology
The Diabetes Centre Islamabad

Other Institutions Participating in the Study:

- National Skill University Islamabad
- NIH Health Research Institute Islamabad

This research project focuses on estimating the prevalence and risk factors of diabetes-related complications in young diabetics.

We express our gratitude to the dedicated researchers, clinicians, and collaborators who contribute to these projects, bringing us one step closer to a healthier future.

Editorial Board

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Feedback

We are excited to hear from you. Please send us your feedback at rc@tdc.com.pk

“The groundwork for all happiness is good health.”

Leigh Hunt