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ORALS:

## **OC1-Multi-Trait Polygenic Scores for Improved T2D Risk Stratification using Qatar Biobank Cohort**

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**Background:** Genome-wide association studies (GWAS) have identified over 500 genetic variants associated with Type 2 diabetes (T2D). Translating these genetic discoveries into effective predictive models for disease risk remains a formidable challenge. Polygenic scores (PRS), amalgamating the influences of multiple genetic variants, present a robust approach for detecting disease susceptibility and stratifying individuals at high risk. Integrating information from genetically correlated traits into PRS models has demonstrated the potential to enhance prediction accuracy and power.

**Objectives:** This study aimed to identify genomic variants associated with T2D risk in the Qatar Biobank (QBB) cohort and construct machine learning (ML) models incorporating multiple PRS predictors

**Methods:** Genome-wide association studies (GWASes) were conducted for 12 traits to identify genomic variants linked to clinical risk factors of T2D. The study involved 14,278 QBB participants, forming the basis for GWAS and PRS development. Multiple weighted PRS models were constructed using associated variants for each trait, and ML models evaluated the combined risk from all 12 predictors.

**Results:** The predictive models showcased a robust ability to stratify T2D cases from controls, with the top-performing model achieving an accuracy of 0.76, an area under the receiver operating characteristic curve (AUC) of 0.85, an area under the precision-recall curve (AUC-PR) of 0.89, and an F1 score of 0.75.

**Conclusion:** PRS models demonstrate the potential to identify individuals at risk of developing T2D and associated complications within our population. Stratifying individuals with T2D into distinct risk groups can inform personalised preventive interventions and facilitate targeted healthcare strategies.

## **OC2- The ratio of thyroglobulin in washout fluid from fine-needle aspiration to serum thyroglobulin level in the evaluation of metastatic cervical lymph nodes in patients with papillary thyroid cancer**

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**Background:** In patients with papillary thyroid carcinoma who exhibit suspicious lymph node characteristics on ultrasonography, fine needle aspiration, with cytology analysis and thyroglobulin level of the aspirated sample (FNAB-Tg), is an important method to detect metastases to cervical lymph nodes (CLN). Despite the FNAB-excellent Tg's diagnostic accuracy, studies have been unable to determine the optimal cutoff value for FNAB-Tg.

**Design and methods:** We conducted a retrospective analysis on 70 patients with papillary thyroid cancer (PTC) or suspected PTC who had ultrasound-detected worrisome CLN. Every patient had an FNA of the CLN, followed by cytology and Tg-level testing of the aspirated sample (FNAB-Tg). The thyroglobulin level of the aspirated biopsy (FNAB-Tg) was obtained in all subjects.

**Results:** Thirty-two patients (45%) have cytology positive for malignancy, 31 of 32 positive cytology have positive FNAB-Tg/serum Tg ratio (ratio >3), while only one has FNAB-Tg/serum TG < 3, though the FNAB-Tg is 4474 ng/ml and serum Tg is 2444 ng/ml. Metastatic PTC to these cervical LN was confirmed on the pathology report from total thyroidectomy or neck dissection. Fourteen patients (20%) have negative cytology and negative FNAB-Tg/serum Tg ratio (ratio <3). Five patients underwent thyroid surgery or neck dissection. The pathology report showed no metastatic PTC in the cervical LN. Seven patients (10%) have negative cytology with positive FNAB-Tg/serum Tg ratio (ratio >3). Four of these patients underwent neck dissection in our institute and were confirmed to have metastatic PTC to these cervical LN. One patient elected to have surgery in his home country.

**Conclusion:-** The ratio of thyroglobulin in washout fluid from fine-needle aspiration to serum thyroglobulin level (FNAB-Tg/serum Tg ratio) is a novel method to overcome the differences in cutoff values and assays used to measure the Tg level both in serum and FNAB. A positive FNAB-Tg/serum Tg ratio (ratio >3) is more accurate than cytology in detecting CLN metastasis in patients with papillary thyroid cancer (PTC). 27% of cervical lymph node metastasis will not be detected if FNAB cytology is used alone to detect metastatic cervical lymph nodes. This will help optimise the surgical approach in patients with PTC before thyroidectomy and also in those with suspected recurrence after the initial treatment.

## OC3- A Nine-Year Data on the Endocrine Adverse Events from Immune Checkpoint Inhibitors in Qatar

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**Background:** Immune checkpoint inhibitors (ICIs) have revolutionised the management of cancer patients, but the emergence of ICI-induced endocrinopathies has introduced new clinical challenges. Despite worldwide recognition of these adverse effects, data from the Middle East is scarce.

**Methods:** This retrospective-observational study included adult patients with malignancies between January/2015-January/2023. Descriptive statistics univariate and multivariate regression models were employed to characterise the incidence of endocrinopathies and the impact of endocrinopathies on mortality.

**Results:** The median age of 649 included patients was 55 years, with male preponderance (70.7%). The overall prevalence of endocrinopathies post-ICI was 29%, with an incidence of new endocrinopathies post-ICI being 26.7%, of which primary hypothyroidism (62.4%) predominated, followed by insulin deficiency (15%), primary hyperthyroidism (13.9%), secondary adrenal insufficiency and lastly diabetes insipidus. Pembrolizumab (62%) was the most administered ICI, followed by Nivolumab (23.7%), Atezolizumab (12.5%), Durvalumab (0.9%), Avelumab (0.6%) and Ipilimumab (0.1%). Multivariate logistic regression analysis (MLRA) identified age (odds ratio [OR] 1.02, 95% CI (1.003-1.03), P=0.02), pre-ICI white-cell count (OR 0.94, 95% CI (0.89-0.99), P=0.04), Pembrolizumab (OR 2.6, 95% CI (1.05-6.3), P=0.04) and Nivolumab use (OR 2.6, 95% CI (1.04-6.6), P=0.04) as main predictors of endocrinopathy.

**Conclusion:** This largest regional cohort showed a notable incidence (26.7%) of endocrinopathies post-ICI therapy. Older age at ICI initiation and specific ICI regimens (Pembrolizumab and Nivolumab) were significant predictors of endocrinopathy in our cohort. These insights underscore the importance of personalised strategies for mitigating the endocrinological effects of ICI therapy as a means of maximising its anti-cancer benefits, particularly among high-risk groups.

## **OC4-The Negative Impact of Poor Early Glycaemic Control on Fetal Birth Weight in Women with Type 1 Diabetes Mellitus is Due To Reduced Placental Weight.**

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**Background:** Women with type 1 diabetes mellitus (T1DM) are at higher risk of delivering either large or small gestational-age fetuses. Recent data suggest that higher first-trimester HBA1c (F-A1c) leads to poor placental development and relatively lower birth weight, while higher third-trimester HBA1c (T-A1c) is associated with increased neonatal weight.

**Objectives:-** To examine the effects of placental weight on the relationship between F-A1c and T-A1c on neonatal weight in women with T1DM.

**Methods:-** This was a cross-sectional study of women with T1DM who attended the National Diabetes Centre-WWRC. We performed a multivariate linear regression analysis (with different models) to examine the effects of F-A1c and T-A1c on neonatal weight. Placental weight in grams was logarithmically transformed. Model 1 included F-A1c and T-A1c; model 2 was adjusted for age and ethnicity; model 3 was further adjusted for BMI, duration of diabetes, gestational weight gain (GWG) and gestational age (GA) at delivery, while model 4 included further adjusted for placental weight. We then performed a mediation analysis on the factors that influence the effect of First and Third-trimester A1c on neonatal weight.

**Results:-** We included 154 women; most were Qatari 84(54.5%), mean age 30.1 ± 4.4 years, mean BMI 28.2 ±5.6 kg/m<sup>2</sup>, mean DM duration was 15.5 ±7.1 years, mean F-A1c 8.0 ± 1.4%, and mean T-A1c 7.0 ± 1.1%. There was a negative association between F-A1c and neonatal weight (b-coefficient -150.9 (95% CI -244.6, -27.2; p<0.001); while there was a positive association between T-A1c and neonatal weight (b-coefficient 162.5(95% CI 44.8-280.2; p<0.001. This relationship remained unchanged after adjusting for age, ethnicity, BMI, duration of diabetes, GWG and GA. After adjusting for placental weight, the T-A1c and neonatal weight associations remained unchanged, but the association between F-A1c was not significant ((b-coefficient -47.2 (95%CI -121.0,26.7]. Mediation analysis showed that 64.4% of the association between F-A1c and neonatal weight is mediated through the placental weight.

**Conclusion:-** Our data support the hypothesis that poor early glycaemic control negatively impacts neonatal weight, likely through poor placental development.

## **OC5-A multi-omic approach offers a distinct molecular signature in obesity with metabolic syndrome compared to obesity only.**

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**Background:** Obesity stands as a formidable public health challenge, contributing to a spectrum of diseases, including cardiovascular disorders and type 2 diabetes mellitus.

**Objectives:-** We hypothesised that obesity with metabolic syndrome, compared to simple obesity, has distinct molecular signatures with respect to blood miRNA, Transcriptome and metabolome.

**Methods:** A cohort of 39 subjects with obesity that included 21 subjects with metabolic syndrome age-matched to 21 subjects with simple obesity was analysed. Whole blood transcriptome, metabolome and miRNA were measured. Seven hundred fifty-four (754) human microRNAs (miRNAs), 704 metabolites using unbiased mass spectrometry metabolomics, and 25,682 transcripts, which include both protein-coding genes (PCGs) as well as non-coding transcripts, were measured. Differentially expressed miRNAs, PCGs, and metabolites were identified and were integrated together using databases such as mirDIP (mapping between miRNA-PCG network), Human Metabolome Database (mapping between metabolite-PCG network) and tools like MetaboAnalyst (mapping between metabolite-metabolic pathway network) to determine dysregulated pathways in obesity with metabolic complications.

**Results:-** A total of 64 miRNAs were differentially expressed between metabolically healthy obese (OBO) versus metabolically unhealthy obese (OBM) patients. A total of 83 metabolites, mostly lipids, were significantly different between the two groups. After integrating the three omics, we identified eight significantly enriched metabolic pathways comprising eight metabolites, 25 protein-coding genes, and 9 microRNAs, each of which is differentially expressed between the subjects with obesity and those with obesity and metabolic syndrome. By performing unsupervised hierarchical clustering on the enrichment matrix of the 8 metabolic pathways, we could approximately segregate the simple obesity strata from that of obesity with metabolic syndrome.

**Conclusions:-** The data suggest that obesity with metabolic complications has a distinct molecular signature. At least 8 metabolic pathways, along with their various dysregulated elements, identified via our integrative bioinformatics pipeline, can potentially differentiate patients with obesity from those with obesity and metabolic complications.

## **OC6- Increased inflammatory and reduced neurotrophic protein profiles are associated with progressive neurodegeneration in type 2 diabetes**

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**Background:** - Diabetic peripheral neuropathy (DPN) is associated with neuropathic pain, erectile dysfunction, and foot ulceration. Corneal confocal microscopy (CCM) can identify early corneal nerve degeneration and patients at risk of developing DPN. The expression of cytokines, chemokines and neurotrophic factors is altered in patients with DPN.

**Objectives:-** To investigate the longitudinal association between circulating inflammatory and neurotrophic proteins and change in corneal nerve morphology in patients with type 2 diabetes (T2D).

**Methods:-** T2D patients aged 18-70 years were recruited from the National Diabetes Center at Hamad General Hospital. Plasma inflammatory and neurotrophic markers (Olink Proximity Extension Assay) and corneal nerve morphology (CCM) were measured at baseline and 2-year follow-up.

**Results:** - 44 patients (52% female) aged 58.29±6.97 years with 13.53±7.22 years of diabetes were studied. Over 2 years, HbA1c significantly reduced (8.06±0.95 vs 7.54±1.20%, P=0.002) without change in total cholesterol (3.95±1.05 vs 3.98±0.81 mmol/L), triglyceride (1.69±1.24 vs 1.64±1.09 mmol/L), HDL (1.03±0.31 vs 1.10±0.38 mmol/L), LDL (2.14±0.86 vs 2.13±0.73 mmol/L), systolic-BP (124.62±12.57 vs 130.18±11.21 mmHg), diastolic-BP (77.32±8.89 vs 75.00±7.19 mmHg) or weight (82.88±12.78 vs 80.84±11.05 kg). Corneal nerve branch density (CNBD) significantly reduced (60.29±33.27 vs 39.00±30.78 branches/mm<sup>2</sup>, P=0.004) without change in fibre density (CNFD) (25.88±8.82 vs 25.03±9.00 fibres/mm<sup>2</sup>, P=0.524) or length (CNFL) (17.20±5.68 vs 15.52±5.65 mm/mm<sup>2</sup>, P=0.08). Eight inflammatory markers increased (IL7(P=0.05), CXCL1(P=0.008), MCP-4(P=0.03), FGF-5(P=0.04), MMP-1(P=0.02), CXCL5(P=0.003), CXCL6(P=0.002), CCL28(P=0.02)) whilst two decreased (CD5(P=0.03), EN-RAGE(P=0.02)). Six neurotrophic factors significantly decreased (NEP(P=0.01), WFKKN1(P=0.02), Beta-NGF(P=0.003), CTSC(P=0.01), SPOCK1(P=0.02), KYNU(P=0.01)). ΔCXCL1, ΔMCP-4, ΔFGF-5, ΔMMP-1, ΔCXCL5, ΔCD5, ΔCXCL6 and ΔCCL8 were significantly associated with ΔCNBD (P<0.01). ΔFGF-5 was associated with ΔCNFL (P=0.02) (Table 1).

**Conclusion:** Despite an improvement in HbA1c and stable risk factors for DPN, there was evidence of progressive neurodegeneration. Targeted proteomics has revealed that increased expression of circulating inflammatory markers and decreased expression of neurotrophic factors is associated with progressive neurodegeneration, thereby identifying novel targets for intervention in DPN.

## **OC7- Gut microbiome and dietary profiling in diabetic and obese children in Qatar**

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**Background:** Type 1 diabetes (T1D) is one of the common pediatric diseases in Qatar. Bacterial dysbiosis and diet have been shown to be contributing factors to T1D.

**Objectives:** we aim to explore the correlation between the gut microbiome and nutrient intake in the pediatric T1D population of Qatar, comparing obese to normal-weight subjects.

**Methods:** Hundred and two pediatric (102) subjects aged 6-12 years were enrolled in the study. The subjects were classified into four groups: T1D (n=57), T1D-Obese(n=11), Obese (n=18), and healthy control subjects (HC, n=16). Fecal samples and 24-hour dietary recalls were collected. Illumina Miseq 16S rDNA sequencing was used for the gut microbiome analysis. The dietary data were analysed by NutritionistPro(Axya Inc). Statistical analysis was conducted using R packages, with a statistical significance of p-value<0.05.

**Results:** The Kruskal-Wallis test showed a significant difference in caloric, carbohydrates, betaine, and maltose intakes among the four groups. In microbiome analysis, we found no statistical significance in alpha diversity, unlike beta diversity (p-value=0.001) among all the groups. Moreover, the dysbiosis measure showed an intriguing but not significant difference among groups (p-value= 0.055). Further analysis was performed to differentiate the bacterial abundance in all the groups. At the genus level, Phascolarctobacterium was highly abundant in the T1D group compared to HC, which affected 15 different pathways, including biotin synthesis, while lactose and galactose degradation was the only enriched pathway in the HC group. In comparison between T1D-obese and obese groups, we found that 20 bacterial species were highly abundant in the T1D-obese subjects. Multiple correlations between nutrients and microbial genera were observed in each group of subjects.

**Conclusion:** These findings show a discriminant gut microbiota abundance and nutrient intake in T1D children according to their BMI and compared to obese and healthy subjects. This knowledge will contribute to further understanding of microbiota's role and food intake as biomarkers in developing and managing T1D.

## **OC8- Machine Learning-Based Model For The Early Detection Of Gestational Diabetes Mellitus**

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**Background:** Gestational Diabetes Mellitus (GDM) is one of the most common medical complications during pregnancy. In the Gulf region, the prevalence of GDM is higher than in other parts of the world. Therefore, there is a need for the early detection of GDM to reduce the short- and long-term sequelae in both the mother and offspring.

**Objective:** To develop a machine learning (ML)--based model for early detection of GDM using data collected during the first trimester.

**Methods:** We studied a dataset collected from the Qatar Birth Cohort (QBiC) from the Qatar Biobank. We considered clinical measurements taken during the first trimester of pregnancy to predict GDM onset using several ML methods.

**Results:** The proposed ensemble-based ML model achieved high accuracy in predicting GDM onset with over 90% accuracy. We confirmed known biomarkers, i.e., a history of high glucose level/diabetes, insulin, cholesterol, HOMA-IR, and LDL, which align with the previous studies. Moreover, we proposed potential novel biomarkers such as NT pro-BNP, FT3, Urea, Magnesium, Prothrombin Time, Basophil, MPV, MCHC, Calcium, Fibrinogen, Sodium, FT4, etc., for early GDM detection.

**Conclusion:** We believe our findings complement the current clinical practice of GDM diagnosis when applied during the first trimester of pregnancy, leading toward minimising its burden on the healthcare system.

# P1-Pilot Study: Oral Microbiome and Immunity in Women with Gestational Diabetes Mellitus

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**Background:** Gestational diabetes mellitus (GDM) is defined as a state of glucose intolerance with an onset during pregnancy. In Qatar, the prevalence rate has reached 21%, which poses a significant health burden. GDM is diagnosed using an oral glucose tolerance test during the second trimester. Early diagnosis is important in mitigating short and long-term risks.

**Objectives:-** To investigate the microbial, gene expression, and cytokine signatures for their potential in predicting GDM.

**Methods:** We utilised a multi-omics approach to identify potential biomarkers through 16S rRNA sequencing of saliva samples, whole blood mRNA sequencing, and serum cytokine profiling. We selected 11 GDM and 9 control subjects from the Omouma cohort at Sidra Medicine. The three omics data were then integrated using the DIABLO method, and downstream analysis was done using R software.

**Results:** Microbial differential abundance analysis revealed several significantly enriched and depleted bacteria taxa as early as the first trimester. Enriched taxa included periodontal disease-associated bacteria. Moreover,  $\alpha$ -diversity was significantly lower at delivery in normoglycemic women. No significant differences in  $\beta$ -diversity were observed. Based on differential gene expression analysis, several upregulated and downregulated genes were identified as early as the first trimester, which included type 2 diabetes mellitus-associated genes. Pathway enrichment analysis revealed that such genes play a role in inflammation, angiogenesis, and adaptive immune responses. IL-6 and IL-4 were found to be significantly higher in women with GDM during the first and second trimesters, respectively. Multi-omics integration of the data showed high separation between GDM and controls using a 3-dimensional machine learning model.

**Conclusion:** Our study highlights the potential of a multi-omics approach for the prediction of GDM and future biomarker discovery. More samples need to be analysed to validate our findings.

## **P2-Comparison of miRNA signature in non-alcoholic fatty liver disease and control (NAFLD).**

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**Introduction:** Non-alcoholic fatty liver disease (NAFLD) accounts for a large proportion of chronic liver disorders worldwide and is closely associated with cardiovascular disease, obesity and type 2 diabetes mellitus. MicroRNAs (miRs) are small non-coding RNAs that have been found to have a regulatory role in transcriptional control mechanisms in guiding metabolic process. These miRNAs play a role in lipid metabolism, inflammation, apoptosis, fibrosis, hepatic stellate cell activation, insulin resistance and oxidative stress, key factors that contribute to the occurrence and progression of NAFLD. There is growing interest in the research community in identifying specific miRNAs that may serve as non-invasive biomarkers for diagnosis or therapeutic targets for the treatment of NAFLD.

**Objectives:** In the present study, we aim to understand the relationship between miRNA and NAFLD.

**Methods:** We performed miRNA microarray (GeneChip miRNA 4.1 Array chip, Affymetrix) analysis on cell-free RNA extracted from plasma samples of 24 NAFLD subjects and 24 healthy controls. All the CEL files generated were analysed using Transcriptome Analysis Console 4.0 software. The miRNA-target interactions and pathways were analysed using MIUNTERNET (MicroRNA Enrichment Turned Network), KEGG pathway analysis and disease ontology analysis software.

**Results:** We identified 17 miRNAs that were significantly and differentially expressed in the NAFLD group compared to controls ( $P < 0.05$  and fold change  $>2$  or  $-2$ ). Among them, 10 miRNA (LET 7a-5P, LET 7b-5P, LET 7c-5P, LET 7d-5P, - LET 7e-5P, mir-122-5p, mir-26a-5p, mir-4429, mir-23b-3p and mir-320d) were up-regulated, and 7 miRNA (mir-19b-3p, mir-6727- 5p, mir-6126, mir-185-5p, mir-22-3p, mir-6724-5p and mir-140-3p) were down-regulated. We performed pathway analysis on 17 miRNAs that were linked to two or more characteristics of NAFLD.

**Conclusion:** our data suggests miRNAs related to Insulin signalling, lipid metabolism, adipose tissue lipolysis, Inositol phosphate metabolism, prolactin signalling, p53 signalling, MAPK

signalling, cellular senescence, cancer, mTOR signalling and platelet activation are dysregulated in NAFLD subjects.

### **P3- EVIDENCE FOR MITOCHONDRIAL DYSFUNCTION IN NON-ALCOHOLIC FATTY LIVER DISEASE (NAFLD).**

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**Background:** Mitochondria is central for maintaining energy homeostasis and normal physiology of cells. Mitochondrial dysfunction or deficiency can trigger metabolic disorders such as insulin resistance, obesity, type 2 diabetes (T2D) and fatty liver disease (NAFLD). MOTS-c (mitochondrial open reading frame of the 12S rRNA type-c), a mitochondrial-derived peptide, inhibits the folate cycle and its tethered de novo purine biosynthesis, activates AMPK and promotes mitochondrial metabolism. The MOTS-c treatment enhances glucose utilisation, promotes insulin sensitivity and restores metabolic homeostasis through the activation of AMPK-dependent mechanisms in skeletal muscle. Further, there is growing evidence that alteration in mtDNA function could contribute to NAFLD.

**Objectives:** In this current study, we aimed to understand the relationship between MOTS-c and circulating mitochondrial DNA/nuclear DNA ratio in subjects with NAFLD, NAFLD +T2D, and controls to assess if a mitochondrial abnormality exists in NAFLD subjects.

**Methods:** MOTS-c levels in plasma were measured using a commercially available kit as per the recommended protocol (BMA biomedical). A total of 50 samples from each group were used for mtDNA/nDNA measurements. Cell-free Mitochondrial DNA and nuclear DNA were extracted from plasma samples using a Magmax™ Cell-Free DNA Isolation kit. Quantitative real-time PCR was performed to measure the expression of mitochondrial DNA using (MT-ND2) and nuclear DNA (NDUFB6) using specific primers, and the ratio of mtDNA / nDNA was calculated.

**Results:** MOTS-c levels were significantly lower in subjects with NAFLD ( $p > 0.0001$ ) and NAFLD+T2D ( $p > 0.0001$ ) group compared to controls. Further, the mtDNA/nDNA ratio was higher in NAFLD ( $p > 0.0001$ ) and NAFLD+T2D ( $p > 0.0001$ ) groups.

**Conclusion:** Our study provides evidence for dysregulated mitochondrial function and association of MOTS-c, mtDNA/nDNA ratio in NAFLD and NAFLD+T2D group of subjects.

## **P4- Exploring the Impact of Glucokinase Mutation on Monogenic Diabetes Development through Human iPSC Models**

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**Background** Glucokinase (GCK, hexokinase IV) phosphorylates glucose to glucose-6-phosphate during glycolysis in pancreatic  $\beta$ -cells and hepatocytes. This rate-limiting step in glucose metabolism enables those cells to respond appropriately to blood glucose levels. Mutations in the GCK gene could cause either hyperglycemia or hypoglycemia. Heterozygous loss of function mutation causes maturity-onset diabetes of the young 2 (MODY2), while homozygous inactivating mutation leads to permanent neonatal diabetes mellitus (PNDM). The development of diabetes due to GCK mutations is not fully understood due to the lack of human models.

**Objectives:** - To understand the effect of GCK mutations on pancreatic  $\beta$ -cells and mature hepatocytes, and to identify the molecular mechanisms underlying the defects associated with GCK mutations using human induced pluripotent stem cell (iPSC) models.

**Methods:** We generated iPSCs from the blood cells of two patients diagnosed with heterozygous and homozygous mutations in the GCK gene. This mutation was confirmed in the patient's samples using whole exome sequencing (WES) followed by Sanger sequencing. Subsequently, we established three iPSC lines from each patient and subjected them to extensive characterisation using different approaches. To understand the effect of the mutation, we conducted an in silico study to capture the protein's 3D structure of the GCK protein and predict the effect of the GCK mutation at the protein level. Furthermore, we used the CRISPR/Cas9 knock-in approach to correct the mutation, generating isogenic controls. Moreover, we generated GCK knockout models to validate the function of GCK during pancreatic islet development. All iPSC lines were differentiated into pancreatic and hepatic lineages to understand the effect of GCK mutations on the development of MODY2 and neonatal diabetes and to explore GCK's role in pancreatic development.

**Results:** Our findings showed that the generated iPSC lines displayed pluripotency characteristics, were able to differentiate into the three germ layers spontaneously and showed normal karyotypes. Our enzymatic preliminary results showed that the mutated GCK protein is less stable than the wild-type (WT) controls, although they are both well-folded. Furthermore, it

showed higher binding ability and affinity to glucose. Moreover, in silico analysis indicated that this GCK mutation may affect the binding affinity of GCK with glucokinase regulatory protein (GKRP). All generated iPSCs, their isogenic controls and knockout models were successfully differentiated into pancreatic  $\beta$ -cells and mature hepatocytes. Additional functional studies were performed on both pancreatic  $\beta$ -cells and mature hepatocytes to understand the molecular mechanisms underlying the defects associated with GCK mutations.

**Conclusion:** These human iPSC models can provide valuable insights into the underlying mechanisms of monogenic diabetes, which will pave the way towards personalised treatment.

## **P5-Profiling of circulating miRNA reveals a role for miRNA-122-5p in Insulin Sensitivity**

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**Background:-** Insulin resistance is one of the defects implicated in type 2 diabetes mellitus (T2DM), widespread in the Middle East and North Africa.

**Objectives:-** This study aimed to assess whether plasma miRNAs are associated with insulin sensitivity.

**Methods:** Plasma was collected at baseline and the end of hyper-insulinemic Euglycemic Clamp (HIEC) HIEC. Plasma samples from 20 subjects with high (HIS) and low (LIS) insulin sensitivity were processed for miRNA array using Affymetrix.

**Results:** At baseline, eleven miRNAs showed a significant difference between LIS versus HIS groups, while at the end of HIEC, three miRNAs were differentially expressed. Analysing each group separately revealed 36 miRNAs to be significantly modulated by insulin infusion versus baseline in the LIS group. In HIS subjects, 17 miRNAs were differentially expressed under insulin stimulation versus baseline. Functional analysis reveals differential enrichment in multiple pathways, including the PI3K-Akt signalling pathway (miRNA-122-5p, FC=6.77), sphingolipid and type 2 diabetes pathways (miRNA-30d, FC= 1.56) and AGE-RAGE signalling pathway (miRNA-93-5p, FC=2.68) in the LIS versus HIS at baseline. Under insulin stimulation, functional analysis reveals differential enrichment in the PI3K-Akt signalling pathway (miRNA-122-5p, FC=9.11).

**Conclusion:** These results underscore the crucial role of miRNA in insulin signalling, particularly in the context of insulin resistance. Notably, we observed increased circulating levels of miRNA-

122-5p in LIS compared to HIS, both at baseline and under insulin stimulation. This finding suggests a role for miRNA-122-5p in regulating insulin sensitivity.

## **P6- Deletion of RFX6, a Diabetes-Associated Gene, Impairs iPSC-Derived Islet Organoid Development and Survival, With No Impact on the Generation of PDX1+/NKX6.1+ Progenitors**

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**Background and Aim:** Homozygous mutations in RFX6 cause Mitchell-Riley syndrome with severe neonatal diabetes, while heterozygous mutations lead to maturity-onset diabetes of the young (MODY). RFX6 plays a crucial role in pancreatic islet development and insulin secretion, yet its functional implications in islet development and diabetes pathogenesis are unclear.

**Methods:** We examined RFX6 expression during various pancreatic islet stages and generated knockout (KO) human RFX6 iPSC lines to study molecular and cellular changes during human islet cell development.

**Results:** Our immunostaining analysis revealed robust RFX6 expression in PDX1+ cells during the posterior foregut (PF) stage. However, at the pancreatic progenitor (PP) stage, RFX6 did not exhibit co-expression with PDX1 and NKX6.1, whereas it co-localised with NEUROG3 and NKX2.2 during the endocrine progenitor (EP) stage. Single-cell analysis demonstrated elevated RFX6 expression in endocrine clusters across various developmental stages. The absence of RFX6 led to a significant decrease in PDX1 expression at the PF stage but did not impact PPs co-expressing PDX1 and NKX6.1. RNA sequencing unveiled the downregulation of crucial genes for pancreatic endocrine differentiation, insulin secretion, and ion transport due to RFX6 deficiency. Moreover, RFX6 deficiency led to smaller islets Page 2 of 2 organoids formation via increased cellular apoptosis, attributed to reduced Catalase (CAT) expression, suggesting a protective role for RFX6 in pancreatic islets. Overexpressing RFX6 reversed defective phenotypes in PPs and EPs.

**Conclusion:** These results indicate that the pancreatic hypoplasia and reduced islet cell formation linked to RFX6 mutations are not due to alterations in PDX1+/NKX6.1+ PPs. Instead,

they result from cellular apoptosis, decreased CAT expression, and downregulation in the expression of pancreatic endocrine genes.

## **P7-Elevated levels of GDF-15 in Children with Type 1 Diabetes Mellitus (T1DM) compared to unaffected siblings**

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**Background:** Type 1 diabetes mellitus (T1DM) is a chronic autoimmune disease characterised by the destruction of insulin-producing  $\beta$ -cells by the action of inflammatory cytokines, monocytic cells, and autoreactive T cells. Complement proteins contribute to T1DM by enhancing the organ-specific autoimmune processes. GDF-15 is a myokine that protects pancreatic  $\beta$ -cell from inflammation-induced cell death and regulates the  $\beta$ -cell function.

**Objectives:-** This study aims to understand the association of GDF-15 with inflammatory cytokines and complement proteins in T1DM.

**Methods:-**Subjects aged 3-18 years with T1DM and positive islet autoantibodies (N=15) and their unaffected siblings without islet autoantibodies (N=15) were recruited from the endocrine outpatient clinics in Sidra Medicine. Exclusion criteria: children with other autoimmune diseases, such as cardiovascular, renal, respiratory, neurological, hepatic, rheumatic, or infectious disorders. Children with febrile illness during the past three months.

**Results:-** Children with T1DM have a significant increase in plasma GDF-15 levels ( $P<0.05$ ) compared to their unaffected siblings ( $P<0.05$ ). Plasma levels of interferon  $\gamma$ -induced protein-10 (IP-10) and the complement proteins, C1Q, C2, C5, Factor-1, Factor-B, and Mannose-binding lectin were also increased significantly ( $P<0.05$ ) in children with T1DM. The levels of GDF-15 were positively correlated with those of TNF-alpha and C2.

**Conclusion:-** The elevated GDF-15 levels that are associated with inflammatory cytokines and complement proteins in T1DM indicate crosstalk or interactions between complement components and GDF-15 in the context of T1DM.

## **P8- Differential expression of cardiometabolic and inflammation markers and signalling pathways between overweight/obese Qatari adults with high and low plasma salivary $\alpha$ -amylase activity**

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**Background:** The relationship between salivary  $\alpha$ -amylase activity (sAAa) and susceptibility to cardiovascular disorders lacks a definitive consensus in available studies.

**Objectives:-** To investigate this association among overweight/obese, otherwise healthy Qatari adults. The study specifically categorises participants based on their salivary  $\alpha$ -amylase activity into high and low subgroups, aiming to provide a more comprehensive understanding of the potential link between sAAa levels and cardiovascular and inflammation markers in this population.

**Methods:** Plasma samples of 264 Qatari overweight/obese (Ow/Ob) participants were used to quantify the sAAa and to profile the proteins germane to cardiovascular, cardiometabolic, metabolism, and organ damage in low (LsAAa) and high (HsAAa) sAAa subjects using the Olink technology. Comprehensive statistical tools, as well as chemometric and enrichment analyses, were used to identify differentially expressed proteins (DEPs) and their associated signalling pathways and cellular functions.

**Results:** A total of ten DEPs were detected. Among them, five were upregulated (QPCT, LCN2, PON2, DPP7, CRKL), while five were downregulated in the LsAAa subgroup compared to the HsAAa subgroup (ARG1, CTSH, SERPINB6, OSMR, ALDH3A). Functional enrichment analysis highlighted several relevant signalling pathways and cellular functions enriched in the DEPs, including myocardial dysfunction, disorder of blood pressure, myocardial infarction, apoptosis of cardiomyocytes, hypertension, chronic inflammatory disorder, immune-mediated inflammatory disease, inflammatory response, activation of leukocytes and activation of phagocytes.

**Conclusion:** Our study unveils substantial alterations within numerous canonical pathways and cellular or molecular functions that are relevant to cardiometabolic disorders among OW/Ob Qatari adults exhibiting low and high plasma sAAa. A more comprehensive exploration of these proteins and their associated pathways and functions offers the prospect of elucidating the mechanistic underpinnings inherent in the documented relationship between sAAa and metabolic disorders.

## **P9- Examining the association of lipid biomarkers and nutritional factors with the risk of cardiovascular disease in obese Qatari adults.**

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**Background:** Cardiovascular disease (CVD) is a major cause of death in Qatar and worldwide. Previous epidemiological studies have identified a need to identify better risk factors for CVD. Lipidomic research has shown a potential role in improving the prediction of CVD risk. Nutritional status is also known to be a risk factor for CVD and to affect lipid profiles.

**Aim:** To investigate the association of lipidomics and nutritional factors with the risk of CVD among obese Qatari adults.

**Methods:** This is a cross-sectional study comprised of 52 obese (BMI >30 kg/m<sup>2</sup>) Qatari men and women aged 18 to 63 years. The participants were recruited by Hamad Medical Corporation (HMC) during their routine checkups at the Bariatric Surgery and Metabolic clinic. The cardiovascular risk score was calculated using the Framingham score. A blood sample was collected for lipid and other biochemical analyses, and anthropometric measurements and history of specific medications were obtained from each participant. Dietary intake was assessed using a 24-hour dietary recall, and the nutrients were computed using Nutritionist Pro software. Multiple linear regression models with sequential addition of dietary and other confounders were used.

**Results:** Triacylglycerol, Zymosterol ester, Diacylglycerol, Phosphatidylinositol and Sterol ester were significantly positively associated with cardiovascular risk score. The relation of Triacylglycerol, Diacylglycerol and Sterol ester to CVD risk persisted even after multiple adjustments for dietary variables, particularly saturated fatty acids, mono- and polyunsaturated fatty acids (MUFA and PUFA), vitamins A and E, fluoride, potassium, and insoluble fibres. However, the association of Zymosterol and Phosphatidylinositol with CVD risk attenuated after the addition of dietary variables to the regression model, MUFA and PUFA, respectively.

**Conclusions:** Multiple lipids were identified to be positively associated with CVD risk in an obese Qatari sample. Specific nutrients influenced the association of CVD risk with Zymosterol and Phosphatidylinositol. Further prospective epidemiological and clinical studies are required to enhance the knowledge about the relation of lipidomics to cardiovascular risk among the Qatari population.

## **P10- Activation of Kv7 channels with Fluriprtine and ML213 alleviates neuropathic pain behaviour in the streptozotocin rat model of diabetic neuropathy.**

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**Background:** Chronic peripheral neuropathic pain (PNP), pain arising as a direct consequence of a lesion or disease affecting the peripheral nervous system, is associated with many types of injury/diseases, including diabetes mellitus. Up to 50% of patients with longstanding diabetes develop PNP, known as diabetic PNP (DPNP). DPNP is extremely debilitating, and patients usually experience a range of symptoms, including pain hypersensitivity. The underlying ionic and molecular mechanisms of DPNP are poorly understood. However, Kv7 channels that have been implicated in the pathogenesis of various types of chronic pain are likely to be involved. We have previously shown that activation of these channels with the anticonvulsant retigabine alleviates neuropathic pain behaviour in the streptozotocin (STZ) rat model of diabetic neuropathy. However, retigabine does not show selectivity for any particular neuronal Kv7 channel subtypes (Kv7.2-5) and shows unspecific effects on other targets like GABA receptors.

**Objective:** To examine, in the STZ model of DPNP, whether activating Kv7 channels with Fluriprtine and ML213 would reverse/attenuate behavioural signs of DPNP

**Methods:** Male Sprague Dawley rats (250-300 g) were used. The STZ model involved a single injection of STZ (60 mg/kg, i.p.). Four groups of rats were used: (1) vehicle (control) group (n=10); (2) Fluriprtine group (6 mg/kg, i.p, n=10) and (3) ML213 group (5 mg/kg, i.p, n=8) and Gabapentin (positive) group (n=10). Behavioural testing for mechanical and heat hypersensitivity was performed using a dynamic plantar aesthesiometer touch stimulator and Hargreaves analgesiometer, respectively. Data are presented as the mean  $\pm$  SEM, and One-way ANOVA with post hoc tests was used.

**Results:** STZ rats exhibited behavioural signs of mechanical and heat hypersensitivity as indicated by significant decreases ( $P < 0.001$ ) in the mean paw withdrawal threshold (PWT) and mean paw withdrawal latency (PWL), respectively, at 35 days post-treatment. Single injections of Fluriprtine and ML213 caused significant ( $P < 0.05$ ) increases in the mean PWT but not PWL, indicating attenuation of mechanical but not heat hypersensitivity. Interestingly, both Fluriprtine and ML213 were as effective as the positive control gabapentin.

**Conclusion:** The findings suggest that Kv7 channels are involved in the mechanisms of mechanical but not heat hypersensitivity associated with DPNP and that their activation with Fluriprtine and ML213 may prove to be effective in treating DPNP in humans.

## **P11- Associations between change in inflammatory and neurotrophic protein profiles, baseline corneal dendritic cell density and change in neuropathic symptoms in patients with type 2 diabetes**

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**Background:-** Neuropathic pain affects ~40% of patients with type 2 diabetes (T2D). Corneal confocal microscopy (CCM) can identify early corneal nerve degeneration and increased corneal dendritic cell density (CDCD), a surrogate marker of inflammation. The expression of circulating cytokines and chemokines is altered in diabetic patients with neuropathic pain. **Objectives:-** To investigate the longitudinal association between circulating neuroinflammatory proteins, CDCD and neuropathic pain in T2D patients.

**Methods:-** Patients with T2D aged 18-70 years were recruited from the National Diabetes Center at Hamad General Hospital. Plasma neuroinflammatory markers (Olink Proximity Extension Assay), corneal dendritic/T-cell densities (CDCD/CTCD) (CCM), and neuropathic pain (DN4 questionnaire) were assessed at baseline and 2-year follow-up.

**Results:-** 44 patients (52% female) aged 58.29±6.97 years with 13.53±7.22 years of diabetes were studied. Over two years, there was a significant reduction in HbA1c (8.06±0.95 vs 7.54±1.20%, P=0.002) and DN4 score (2.68±2.68 vs 1.71±2.66, P=0.001), with no change in total cholesterol (3.95±1.05 vs 3.98±0.81 mmol/L), triglyceride (1.69±1.24 vs 1.64±1.09 mmol/L), HDL (1.03±0.31 vs 1.10±0.38 mmol/L), LDL (2.14±0.86 vs 2.13±0.73 mmol/L), systolic-BP (124.62±12.57 vs 130.18±11.21 mmHg), diastolic-BP (77.32±8.89 vs 75.00±7.19 mmHg) or weight (82.88±12.78 vs 80.84±11.05 kg). Baseline CDCD was 16.61±9.38 cells/mm<sup>2</sup>, CTCD was 64.71±48.84 cells/mm<sup>2</sup>, and CTCD/CDCD ratio was 4.92±5.43. Eight inflammatory markers increased (IL7(P=0.05), CXCL1(P=0.008), MCP-4(P=0.03), FGF-5(P=0.04), MMP-1(P=0.02), CXCL5(P=0.003), CXCL6(P=0.002), CCL28(P=0.02)), whilst two (CD5(P=0.03), EN-RAGE(P=0.02)) decreased. Six neurotrophic factors (NEP(P=0.01), WFKKN1(P=0.02), Beta-NGF(P=0.003), CTSC(P=0.01), SPOCK1(P=0.02), KYNU(P=0.01)) significantly decreased over the 2-year-follow-up. ΔCCL28 (P=0.03) and ΔNEP (P=0.03) were positively associated with ΔDN4. ΔCXCL1 (P=0.04) and ΔCXCL6 (P=0.04) were negatively associated with baseline CDCD, and ΔWFKKN-1 (P=0.05) was positively associated with baseline CTCD/CDCD ratio (Table 1).

**Conclusion:-** Targeted proteomics has identified associations between changes in circulating neuroinflammatory molecules, corneal inflammatory cell densities and neuropathic symptoms in patients with T2D. This study provides novel insights into the association between circulating neuroinflammatory markers, corneal neuroinflammatory cells and neuropathic pain.

## **P12-Prevalence of metabolically healthy obesity and metabolically unhealthy normal weight in Qatar, and its associated underlying mechanisms using an integrated multi-omics approach: a cross-sectional study.**

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**Background:** Qatar faces a significant health challenge with high rates of diabetes and obesity, exceeding global averages. Type 2 diabetes is predominant, affecting 90-95% of cases, with prediabetes rates also notably high. Despite high obesity rates, not all overweight or obese individuals develop diabetes or prediabetes, leading to the identification of metabolically healthy obesity (MHO) and metabolically unhealthy normal-weight (MUNW) phenotypes. Understanding these phenotypes is crucial for personalised treatment and prevention strategies.

**Objectives:** Our study aims to assess the prevalence of MHO and MUNW phenotypes in the QBB cohort and elucidate their underlying mechanisms.

**Methods:** Clinical data of 6000 adults were obtained from Qatar Biobank (QBB) and used to determine the prevalence of obesity and the corresponding metabolic health, whether normal weight or obese, using comprehensive statistical tools. Proteomic and metabolomic profiles of 350 participants were analysed using chemometric methods and enrichment analyses to identify differences in protein and metabolite expression and their associated signalling pathways.

**Results:** The mean age of the participants was  $40 \pm 10$  years for both sexes, of which 57.7% are women and obesity is 43.8%. MHO was more prevalent in women, whereas MUNW was more prevalent in men. The prevalence of prediabetes was 8.7% vs 23.68% in MUNW women and men, respectively. Diabetes and hypertension prevalences were 17.39% and 26.09%, respectively, in MUNW women and 15.79% and 15.79% respectively in MUNW men. Metabolomic analysis revealed that lactose metabolism, carnitine synthesis, glycolysis, starch and sucrose metabolism make up a crucial part of metabolic changes between MHO and MUNW. Proteomic analysis revealed many differentially expressed proteins (DEP) between MHO and MUNW, and

functional enrichment analysis highlighted several relevant signalling pathways and cellular functions enriched in the DEPs

**Conclusion:** Our research reveals significant changes in multiple cellular pathways and molecular functions related to cardiometabolic disorders in MHO/MUHNW Qatari adults. A more thorough investigation of these proteins and metabolites and their associated pathways and functions provides the opportunity to better understand the mechanistic basis underlying the observed association with metabolic health.

## **P13- National Screening Rates For Diabetes In Pregnancy between 2019-2022.**

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**Background:** Diabetes is one of the most common medical complications during pregnancy. Universal screening for DIP was shown to be associated with reduced adverse pregnancy outcomes. All women who are not known to have preexisting diabetes are screened during their first antenatal care visit with fasting blood glucose (FBG) ± HBA1c and, if normal, with an oral glucose tolerance test (OGTT) in the second trimester.

**Objectives:** In this analysis, we aim to report the uptake rates of the national screening program for DIP. We compare the demographics and serious pregnancy outcomes screened (C-section, Intrauterine fetal death (IUFD), large for gestational age (LFD), Small for gestational age (SFD), macrosomia, and preterm delivery between women who were and were not screened.

**Methods:-** This retrospective study included all women who gave birth in Hamad Medical Corporation (HMC) hospitals between 2019 and 2022. For this analysis, we excluded all women with preexisting diabetes.

**Results:-** We included 93474 women, of which 78735 were screened, and screening rates (95% CI) is 84.2%( 84.0-84.5%). Women who were screened were significantly older than those who were not screened (mean age 30.1 ±5.3 vs 29.2 ± 5.3 years, p<0.001). More Asian women were screened compared to Qatari, Arab and Other ethnicities (86.2%, 82.6%, 84.2%, and 83.0%, respectively; p<0.001).

The median time to the first screening test was 17 (IQR 9-26) weeks. Compared to women who were not screened, women who were screened had lower rates of IUFD (4.8 per 1000 deliveries vs 6.2 per 1000 deliveries,  $p=0.019$ ), lower rates of SFD (13.1% vs 15.8%;  $p<0.001$ ); higher rates of C-section (38.1% vs 32.8%;  $p<0.001$ ) and higher rates of preterm delivery (9.6% vs. 8.1%;  $p<0.001$ ). There was no difference in the rates of LFD and macrosomia between the two groups.

**Conclusion:** Qatar has the highest reported screening rates for DIP. More data is required to examine the barriers to DIP screening and enhance the uptake further.

## **P14-Prevalence of Diabetes in Pregnancy (DIP) in Qatar- 2019-2022**

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**Background:-** DM is one of the most common medical complications during pregnancy. DIP is classified as preexisting or newly detected DM. Newly detected diabetes in pregnancy is classified into Gestational Diabetes Mellitus (GDM) and newly detected type 2 diabetes (N-T2D).

**Objectives:** In this analysis, we aim to report the prevalence of preexisting type 1 diabetes (T1D), preexisting type 2 Diabetes (T2D), GDM, and N-T2D.

**Methods:-** This retrospective study included all women who gave birth in Hamad Medical Corporation (HMC) hospitals between 2019-2022. We used the WHO-2013 criteria to define GDM and N-T2D

**Results:** - We included 94,422 women who gave birth to 96,017 neonates (85.7%) out of 112,080 neonates born nationwide. The number of women with preexisting diabetes was 2,496 women. Of 91,926 eligible women, 77,372 (84.2%) were screened for DIP. The prevalence of GDM is 31.6% (95% CI: 31.3-32.0%); N-T2D is 2.2% (95% CI: 2.1-2.3%), and preexisting T2D and T1D were 2.6% (95% CI: 0.8-3.0%) and 0.2% (0.19-0.25), respectively. Qatari had the lowest rates of GDM but the highest rates of N-T2D, T2D, and T1D (30.2%, 2.6%, 4.0% and 0.5%), while Asian women had the highest overall rates of DIP, 40.3%.

**Conclusion:** - Almost a third of all women are affected by DIP. More studies should focus on risk factors and explore prevention methods to reduce this burden.

## **P15- Outcomes Of Women With GDM Approximate Those With No GDM—Report From The National Screening Diabetes Program.**

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**Background:-** GDM is one of the most common medical complications during pregnancy. GDM is associated with an increased risk of adverse maternal and fetal outcomes. Historical data from Qatar indicated a high level of adverse outcomes in women with GDM.

The Qatar national diabetes strategy mandated a systematic screening of all pregnant women and established treatment and referral pathways. The national diabetes in pregnancy guidelines provide a comprehensive framework for the management of GDM to minimise adverse pregnancy outcomes.

**Objectives:-** In this analysis, we aim to compare the pregnancy outcomes of women with and without GDM after the implementation of the systematic screening for GDM. We compared the demographics and serious pregnancy outcomes screened (C-section, Intra-uterine fetal death (IUFD), Large for gestational age (LFD), Small for gestational age (SFD), macrosomia, and preterm delivery) between women with and without GDM.

### **Methods:-**

This retrospective study included all women who gave birth in Hamad Medical Corporation (HMC) hospitals between 2019 and 2022. We excluded women with preexisting DM and women who were not screened for diabetes during pregnancy.

**Results:** - We included 76949 women, of which 17648 (22.9%) were Qatari, and the mean age was  $30.1 \pm 5.2$  years. Compared to the non-GDM group, women with GDM were older ( $30.8 \pm 5.3$  versus  $29.7 \pm 5.2$  years,  $p < 0.001$ ), (had higher rates of C-section (39.4% vs 36.1%,  $p < 0.001$ ) and LGA (6.8% vs 6.0%,  $p = 0.001$ ), but lower rates IUFD (0.35% vs 0.54%,  $p = 0.001$ ) and SGA (11.9% vs 13.7%,  $p = 0.001$ ). There was no difference in the macrosomia and preterm delivery rates between the two groups.

**Conclusion:** The systematic Identification and management of GDM brings outcomes closer to that of non-GDM.

## **P16- New-onset Type 2 DM (N-T2D) Have A Higher Risk Of Adverse Pregnancy Outcomes Compared To Women With GDM-Report From The National Screening Diabetes Program.**

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**Background:-** Based on the 2013- WHO criteria, newly detected diabetes in pregnancy is classified as either gestational diabetes (GDM) or new onset type 2 diabetes mellitus (N-T2D). There are very few reports in the literature examining the demographics and pregnancy outcomes of women with N-T2D.

**Objectives:-** In this analysis, we aim to compare the pregnancy outcomes of women with N-T2D and those with GDM. We compared the demographics and serious pregnancy outcomes screened (C-section, Intra-uterine fetal death ( IUFD), Large for gestational age (LFD), Small for gestational age (SFD), macrosomia, and preterm delivery).

### **Methods:-**

This retrospective study included all women who gave birth in Hamad Medical Corporation (HMC) hospitals between 2019-2022. We only included women who were screened for diabetes in pregnancy.

**Results:** - We included 27476 women, of which 25690 (93.5%) had GDM and 1786 (6.5%) had N-T2D. Compared to women with GDM, women with N-T2D were older ( $31.5 \pm 5.4$  vs.  $30.8 \pm 5.3$  years,  $p < 0.001$ ) and were more likely to be Qatari (27.3% versus 22.3%,  $p < 0.001$ ). Women with N-T2D had higher rates of C-section (45.2% vs 39.4%,  $p < 0.001$ ), preterm delivery (13.9% vs 9.7%,  $p < 0.001$ ), LGA (10.5% vs 6.8% vs,  $p = 0.001$ ), and macrosomia ( 6.1% vs 4.9%,  $p < 0.014$ ). There was no difference in the SFD and IUFD between the two groups.

**Conclusion:** - N-T2D have higher rates of pregnancy complications compared to women with GDM.

## **P17-Prevalence of Pre-Pregnancy Obesity and Excessive Gestational Weight Gain**

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**Background:-** Almost one-third of all adverse pregnancy outcomes could be attributed to maternal obesity. Excessive gestational weight gain (E-GWG) is an independent risk factor for maternal and fetal complications such as C-section, macrosomia, and Intra-uterine fetal death. The national guideline in Qatar has specific guidance on the weight gain parameters during pregnancy.

**Objectives:-** In this analysis, we aim to report the prevalence of pre-gravid maternal obesity and E-GWG.

**Methods:-** This retrospective study included women who gave birth in Hamad Medical Corporation (HMC) hospitals between 2021-2022. We used ethnic-specific definitions to classify the women into normal weight, overweight and obesity. We excluded women with preexisting diabetes. E-GWG was defined based on the national guidelines and was corrected for gestational age at delivery,

**Results:** - We included 34708 women, of which 10441 (30.8%) were Qatari with a mean age of  $30.7 \pm 5.3$  years. The prevalence of overweight was 29.3% (95% CI 28.8-29.75), while the prevalence of obesity was 43.0% (95% CI 42.5-43.6%). The prevalence of E-GWG was 55.3% (95% CI 54.8-55.9%). Obesity was recorded more often in Asians, 65.2%, than in Qatari and Arabs (35.7% and 35.2%, respectively,  $p < 0.001$ ). In contrast, more Qatari had E-GWG than Arabs and Asians (57.1%, 55.0% and 52.3%, respectively,  $p < 0.001$ ).

**Conclusion:** - The high prevalence of pre-pregnancy obesity and excessive gestational weight gain is alarming. More analysis will follow on the impact of both conditions on pregnancy outcomes.

## **P18- Obesity, Excessive Gestational Weight Gain (GWG), and Not Gestational Diabetes Mellitus (GDM) Are the Main Risk Factors for Large Babies**

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**Background:-** Almost one-third of all adverse pregnancy outcomes could be attributed to maternal obesity. Obesity and excessive GWG (E-GWG) can increase the risk of both new-onset maternal diabetes and adverse pregnancy outcomes.

**Objectives:** In this analysis, we aim to report the risk factors for maternal complications, which are significant for gestational age (LGA ), macrosomia, and C-section.

**Methods:-** This retrospective study included women who gave birth in Hamad Medical Corporation (HMC) hospitals between 2021-2022. We excluded women with preexisting DM and those who were not screened for diabetes in pregnancy (DIP). We performed a multivariate logistic regression analysis for each dependent outcome. We included maternal age, ethnicity, BMI categories, excessive gestational weight gain, and maternal new-onset diabetes.

**Results:** - We included 34,708 women, of which 10,441 (30.8%) were Qatari with a mean age of  $30.7 \pm 5.3$  years. The risk of LGA was increased by 1.4, 2.2 and 2.2 folds in women with overweight, obesity and E-GWG, respectively (OR 1.4 [95% CI 1.2-1.6], 2.2 [95% CI 1.9-2.5] 2.06 [1.8-2.3]). The odds of macrosomia were increased by 1.4, 2.1 and 2.2 folds in women with overweight, obesity and E-GWG, respectively ( OR 1.4 [95% CI 1.2-1.7], 2.1 [95% CI 1.8-2.4], 2.2 [1.9-2.5]). Neither GDM nor newly detected T2D were associated with an increased risk of LGA and macrosomia. While the risk of C-section was significantly increased with maternal overweight (OR 1.3 [95% CI 1.2-1.3]), maternal obesity (OR 1.37 [95% CI 1.6-1.8]), E-GWG (OR 1.3 [95% CI 1.3-1.4]), GDM (OR 1.1 [95% CI 1.0-1.1]), and N-T2D (OR 1.3 [95% CI 1.1-1.4])

**Conclusion:** - Maternal obesity and excessive gestational weight gain are the main risk factors for large babies. Given the high prevalence of maternal obesity in Qatar, we recommend that all pregnant women should receive dietary counselling.

## **P19-Effect of Diet and Lifestyle in Pregnant Women Supplemented with Myo-inositol to Prevent Gestational Diabetes Mellitus**

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**Background:** Gestational Diabetes Mellitus (GDM) is a major public health issue in Qatar, with a 23.5% prevalence. The food supplement Myo-inositol (MI) has been proposed to reduce GDM incidence in high-risk pregnant women. However, there is still a knowledge gap on its interaction with diet and lifestyle and insufficient evidence to support its routine use.

**Objectives:** To evaluate the effect of dietary intake and physical activity on MI supplementation and the development of GDM during the overall pregnancy and at each trimester.

**Methods:** A randomised double-blinded clinical trial was conducted on pregnant women recruited from Sidra Medicine. Patients were randomised to placebo (n=33) and MI (n=31). GDM was diagnosed at 24-28 weeks of gestation using the Oral Glucose Tolerance Test. The dietary intake was measured using 24-hour dietary recall and Food Frequency Questionnaires (FFQ) at each trimester of pregnancy. Lifestyle and physical activity questionnaires were collected at the same time points. The nutrient breakdown was calculated using Nutritionist Pro software, and the dietary patterns were assessed using the Healthy Eating Index (HEI) and Dietary Inflammatory Index (DII).

**Results:** We observed a higher intake of soluble fibres, biotin, potassium, isoflavones, fructose and glucose in the MI group during the overall pregnancy, which corresponded to a higher consumption of fresh juices and a lower intake of added sugar ( $p < 0.05$ ). Among the placebo group, subjects that developed GDM consumed more sugar, whereas the no-GDM subjects consumed more olive oil ( $p < 0.05$ ). DII decreased across trimesters ( $p = 0.0320$ ); DII significantly decreased in GDM cases between MI and placebo ( $p = 0.0303$ ). Conversely, the HEI increases during pregnancy ( $p = 0.0328$ ), while there are no differences among GDM status and treatment arms. No difference in physical activity patterns was detected among the treatment arms and during pregnancy. However, the majority of participants performed minimal physical activity overall.

**Conclusion:** Women taking MI showed a healthier diet in terms of nutrients, consumption of food items, and a less inflammatory pattern. Our data show that the interaction between diet and MI can improve the effect of MI on reducing the risk of GDM. However, more studies are needed to clarify if there is any interference between diet and MI.

## **P20- Gestational Diabetes: Insights into Prevalence and Post-Partum Screening Trends in Qatar-A Retrospective Study in Al Wakra Hospital**

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**Background:** Gestational diabetes mellitus (GDM) affects up to 23.5% of pregnant women. GDM significantly increases the risk of developing type 2 diabetes mellitus (T2DM) later in life. Post-partum screening is crucial to identify women at risk for T2DM, but adherence to this practice can vary.

**Objectives:-** To assess the prevalence of GDM in Al Wakra Hospital, evaluate postpartum screening rates, and investigate the incidence of T2DM among women diagnosed with GDM.

**Methods:** This retrospective study examined records of 17,469 deliveries at Al Wakra Hospital from January 1st, 2019, to October 31st, 2022. GDM was identified based on HMC guideline criteria, including screening with GTT at 24-28 weeks. Subsequently, post-partum screening rates and T2DM diagnoses at six weeks were analysed.

**Results:** GDM prevalence was substantially higher than previously reported (29.76% vs. 23.5%). Our analysis of GDM subtypes within the diagnosed cases revealed a predominance of impaired fasting blood sugar (IFG), affecting over 92% (4813 women) of women with GDM. Significant GDM cases were identified primarily through elevated fasting blood glucose levels. Conversely, impaired glucose tolerance (IGT) diagnosed through elevated blood sugar levels at 1 or 2 hours during the GTT was less prevalent, affecting 5.6% (1-hour IGT) and 1.8% (2-hour IGT) of women with GDM. Only 36.1% of women diagnosed with GDM underwent the recommended postpartum screening at six weeks. Of those who underwent screening, 1.2% were diagnosed with T2DM.

**Conclusions:** This study highlights a considerably higher prevalence of GDM in Al Wakra Hospital than previously reported, with impaired fasting blood sugar being the most common subtype. The low rate of postpartum screening represents a missed opportunity for early T2DM prevention. Further research is needed to understand the factors contributing to the high GDM prevalence and to develop strategies for improved GDM diagnosis, education, and postpartum screening practices to manage diabetes risk in this population better.

## **P21- Maternal Outcomes in Metformin-treated Gestational Diabetes Mellitus: A Retrospective Cohort Study**

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**Background:-** The impact of metformin use in GDM on maternal outcomes is still uncertain, as results vary among different populations.

**Objectives:-** We aimed to investigate the association between treatment with Metformin and adverse maternal outcomes in GDM patients in a high-risk population. T

**Methods:-** This retrospective cohort study compared women with GDM who received Metformin versus those treated with dietary intervention alone and analysed the risk of maternal outcomes between the groups.

**Results:-** The study included 649 women with GDM, with 438 (67.5%) treated with dietary intervention only and 211 (32.5%) treated with Metformin. The metformin group had an older age, higher pre-pregnancy BMI, and lower gestational weight gain at baseline than the dietary control group ( $p < .001$ ). The study found that women treated with Metformin had a significantly lower gestational age at delivery and a higher incidence of C-section and polyhydramnios compared to dietary intervention alone ( $p < .05$ ). The use of Metformin was not significantly associated with an increased risk of maternal outcomes after adjusting for age, fasting glucose, pre-pregnancy weight, and gestational weight gain.

**Conclusion: In contrast to previous studies, our study found no evidence to suggest that metformin use in GDM increases the risk of preterm labour. Despite the absence of increased risk, it is likely that these patients, who had higher baseline age and weight, were in a more advanced stage of GDM pathogenesis, leading to the need for Metformin in addition to dietary control.**

## **P22- Effect of Early Diagnosis of Gestational Diabetes Mellitus on Pregnancy Outcomes: A Retrospective Analysis**

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**Background:-** The debate surrounding the effect of the timing of gestational diabetes mellitus (GDM) diagnosis on pregnancy outcomes has gained attention in recent years.

**Objectives:** To compare pregnancy outcomes between GDM patients diagnosed early in pregnancy with fasting blood glucose (FBG) and those diagnosed through the standard oral glucose tolerance test (OGTT) in the second trimester.

**Methods:-** This retrospective cohort study compared women with early-diagnosed GDM (FBG $\geq$ 5.1 mmol/L) at the initial prenatal visit to those with standard-diagnosed GDM (using a 75g OGTT) in the second trimester. The incidence and risk of maternal and neonatal outcomes were compared between the two groups using appropriate statistical tests.

**Results:-** A total of 437 women with GDM were included; out of these, 113 (25.9%) were diagnosed early in pregnancy, while 324 (74.1%) were diagnosed in the second trimester. Women diagnosed with FBG had a higher pre-pregnancy BMI and gained less weight during pregnancy compared to those diagnosed with OGTT ( $p < 0.05$ ). The incidence of maternal and neonatal outcomes and the need for metformin treatment did not significantly differ between the two groups. Multivariate analysis showed that GDM diagnosed early with FBG was not associated with an increased or reduced risk of adverse outcomes.

**Conclusion:-** The early diagnosis of GDM with FBG did not significantly affect pregnancy outcomes, possibly due to lower gestational weight gain and early dietary intervention and pharmacologic treatment. Further studies are needed to support the early screening and treatment of GDM in high-risk populations.

## **P23- The Effect of Myo-Inositol supplementation in Women during Pregnancy on Fetal and Maternal Outcomes: Report from the MiGDM Trial**

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**Background:** Gestational Diabetes Mellitus (GDM) is a prevalent complication of pregnancy, affecting approximately 23.6% of Qatari women. Myo-inositol, a readily available FDA-approved food supplement, has shown promise in reducing the incidence of GDM, but further research is required, particularly in diverse ethnic contexts like Qatar.

**Objective:** To assess the effect of antenatal dietary myoinositol supplementation on the incidence of GDM among pregnant women in Qatar. Secondary objectives include evaluating its impact on gestational weight gain, the need for metformin or insulin therapy, and fetal outcomes such as macrosomia and neonatal hypoglycemia, among others.

**Methods:** This prospective, randomised, double-blind, placebo-controlled clinical trial planned to enrol 640 pregnant women attending the antenatal care at Sidra Medicine, with 320 participants allocated to each arm. Participants were randomised to receive either Myo-inositol supplementation or placebo within the first 16 weeks of gestation

**Results:** The study was terminated due to lack of funding. Sixty-seven (67) pregnant women were recruited, and 43 patients completed the study of which 18 patients in the Myo-Inositol group and 25 in the placebo group. No significant differences between the two groups were observed in maternal age, BMI, or gestational weight gain, HOMA B or HOMA IR. Additionally, the two groups had no significant difference in maternal or neonatal complications. Dividing the groups into those who developed GDM vs those without showed significantly higher fasting insulin levels ( $p = 0.027$ ) and an increase in insulin resistance measured by HOMA IR ( $p = 0.010$ ) in the GDM group compared to the non-GDM group. Additionally, the GDM group had a higher rate of cesarean section ( $p = 0.003^*$ ) and a significantly lower gestational age ( $p = 0.003^*$ ) than the non-GDM group. Furthermore, neonates born to mothers with GDM showed a significantly lower birth weight ( $p = 0.003^*$ ) compared to those without GDM.

**Conclusion:** Myo-inositol supplementation in women during pregnancy did not affect maternal or neonatal outcomes. However, the reported numbers of this study were small and repeating the RCT with enough power is warranted

## **P24- Gestational Diabetes Is Associated with Abnormalities in Glucose Excursion in Early Pregnancy**

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**Background:** Gestational diabetes mellitus (GDM) is a condition that occurs during pregnancy due to dysglycemia in women with preexisting beta cell dysfunction. Typically, insulin resistance peaks in the early third trimester, leading to GDM development around 24 to 28 weeks gestation. While there is debate over early screening before 20 weeks (eGDM), studies remain inconclusive. Early therapy for first-trimester prediabetes has not significantly reduced uGDM incidence. Observational studies comparing eGDM and uGDM outcomes found higher complications in the

eGDM group, but recent trials showed minimal benefit for eGDM intervention. Yet, it remains unknown if glycemic abnormalities associated with uGDM begin in the first trimester. This research assesses glucose excursion changes in early and late pregnancy to determine if abnormalities precede uGDM development.

**Objectives:** To pinpoint a potential link between first-trimester glucose excursion (dwAG) and the emergence of gestational diabetes mellitus (GDM) in the early third trimester and to determine whether Glucose excursion is a risk factor in early pregnancy for the development of GDM at the usual time in pregnancy.

**Methods:** A cohort study using data from CERNER and PHCC in Qatar examined the oral glucose tolerance test (GTT) results in pregnant women before 20 weeks and again in the early third trimester. There were 35,070 eligible pregnancies in the database between December 2016 and March 2023, of whom 497 women met the inclusion criteria. The study excluded pregnant women with preexisting diabetes mellitus type 1 or 2. The study's primary outcome was to examine glucose excursion (using Doi's weighted average glucose; dwAG) in early pregnancy to see if it linked with GDM diagnosis at the usual time.

**Results:** Of the 497 patients that were included, at a cutoff of 6 mmol/L for dwAG, 43/232 women (18.5%) below this threshold and 161/265 women (60.8%) above this threshold developed GDM in the early third trimester of pregnancy respectively.

**Conclusion:** We were able to demonstrate that early pregnancy glucose excursion is already rising in those who develop (compared to those who do not develop) GDM at 24 – 28 weeks, which can help identify women at high risk.

## **P25-Lack of Equivalency for Classification of GDM by Standard and Unified Criteria.**

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**Background:** Gestational Diabetes Mellitus (GDM) affects 14% of pregnancies worldwide. Concerns about overdiagnosis have emerged due to evolving diagnostic criteria, potentially leading to unnecessary interventions and increased costs.

**Objectives:** There are two criteria for diagnosing gestational diabetes (GDM). The first is based on measuring three values on the glucose tolerance test (GTT) and diagnosing when any value is abnormal (individual time-point criterion). The second is based on creating a weighted average of the three values and using the average to split glycemic status into NGG, IGG, GDM, and hGDM (unified criterion). There is no information currently regarding how these two criteria relate to each other in diagnosing GDM. This study aims to make this comparison.

**Methods:** A cross-sectional study was conducted using publicly available data on a cohort of pregnant women. Two criteria were evaluated for determining the cross-classification of diagnosis. The individual time-point criterion had a binary outcome (GDM yes/no), while the unified criterion had the four previously mentioned outcomes.

**Results:** The unified criterion would have deemed one in eighty-five women at high risk within the low-risk (non-GDM) category. More importantly, the unified criterion would have deemed one in two women at low risk within the high-risk (GDM) category.

**Conclusion:** The standard time-point-based criterion is not equivalent to the unified criterion in risk estimation. This is important as the unified criterion correlates with the area under the GTT curve, which is associated with glucose excursion and is predictive of the net effect of insulin resistance and beta-cell function.

## **P26-Pattern of Gestational Weight Gain in Gestational Diabetes Patients: A Retrospective Study Based in Qatar**

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**Background:-** Gestational Weight Gain (GWG) is a modifiable risk factor for adverse pregnancy outcomes in gestational diabetes mellitus (GDM) patients.

**Objectives:-** to examine the pattern of GWG in GDM patients in Qatar.

**Methods:-** This retrospective analysis studied GWG in women with GDM who received prenatal care at a tertiary care centre between 2019 and 2020. The women were stratified into four weight categories based on pre-pregnancy BMI: Underweight, Normal, Overweight, and Obese. The total weight gain for each patient was compared to the recommended range for their respective weight category based on the Institute of Medicine (IOM) Weight Gain Recommendations for Pregnancy (2009).

**Results:-** A total of 575 patients were included in the study. The majority of women (57.7%) belonged to the overweight and obese groups, while only 0.9% were underweight. 40.3% and

30.6% of the normal weight and obese groups, respectively, had weight gain below the recommended range. GWG above the recommended range was observed in 53.5% of the overweight group, 43.3% of the obese group, and 30.3% of the normal weight group. In all, 29.0% of women achieved the recommended weight gain, but 41.0% had excessive weight gain.

**Conclusion:-** The study found that most patients in this high-risk population did not achieve GWG within the recommended range, with most women gaining excessive weight. Closer attention must be paid to maternal weight gain in overweight and obese GDM patients due to the growing evidence of the impact of excessive weight gain on pregnancy outcomes.

## **P27- Neonatal Outcomes in Metformin-treated Gestational Diabetes Mellitus: A Retrospective Cohort Study**

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**Background:-** Although over 90% of gestational diabetes (GDM) patients who require pharmacologic treatment in Qatar are prescribed Metformin, there is limited data on the effects of metformin use during pregnancy on neonates.

**Objectives:-** To investigate neonatal outcomes in GDM patients treated with Metformin.

**Methods:-** We retrospectively examined a cohort of GDM patients who received prenatal care at a tertiary care centre over two years. We compared the incidence and risk of neonatal outcomes in patients treated with Metformin to those on dietary control alone.

**Results:-** The study included 649 women, 438 on diet control alone and 211 on Metformin. The metformin group had a higher mean birth weight percentile, higher incidence of large for gestational age (LGA) infants, and higher incidence of neonatal jaundice ( $p < .05$ ). Compared to dietary intervention alone; metformin use was associated with a higher risk of LGA infants (OR: 1.68; 95% CI: 1.14–2.48). However, treatment with Metformin was not significantly associated with adverse neonatal outcomes when adjusted for the confounding factors of age, fasting glucose, pre-pregnancy weight, and gestational weight gain.

**Conclusion:-** Notably, metformin use was not linked to the increased risk of small for gestational age infants suggested by previous studies. Nonetheless, women treated with Metformin had a higher incidence of LGA infants and neonatal jaundice compared to those on dietary control alone, which could be attributed to increased maternal hyperglycemia and disease severity in these patients. Our study demonstrated that metformin use in GDM does not increase the risk of adverse neonatal outcomes.

## **P28 - Integrated care for women with type 2 diabetes mellitus (T2D) during pregnancy improves Glycemic Control.**

**Naglaa Alsharkawa, Ifrah Hassan, Eman Othman, Annama Joseph, Nahad Alalwai, Lubna Dagash, Ahlam Alsaadi, Nassema Alouche, Khaled Baagar, Hamda Ali, Naela Almalahy, Nour Al-Shaybani, Fatima Asheer, Fatin El-Taher, Mohammed Bashir.**

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**Background:** - Women with T2D during pregnancy are at higher risk of complications, including pre-eclampsia, large for data (LFD), macrosomia, shoulder dystocia, C-section, and Intrauterine fetal death (IUFD). The Clinical Care Program (CCP) provides structured, evidence-based, multidisciplinary integrated care for women with T2D during pregnancy who attend the National Diabetes Centre- Women Wellness and Research Centre.

**Objective:** To evaluate the impact of the CCP on glycaemic control in women with T2D.

**Methods:** This is a retrospective study in which we compared the glycaemic control of women with T2D before and after the implementation of the CCP. Group A included 383 women who attended the service before 2016, and Group B included 850 women after 2016.

**Results:** At baseline, there was no difference in the mean age and mean duration of DM between group A and group B ( $34.5 \pm 7.0$  years vs  $34.4 \pm 5.0$  years,  $p=0.803$ ) and ( $3.8 \pm 4.0$  vs  $4.2 \pm 3.9$  years,  $p=0.198$ ). However, group B had higher pre-pregnancy BMI compared to group A ( $34.0 \pm 6.6$  vs  $32.7 \pm 6.3$  kg/m<sup>2</sup>,  $p<0.001$ ) but lower first trimester HBA1c ( $7.0 \pm 1.5$  vs  $7.2 \pm 1.6\%$ ,  $p=0.016$ ). More women in group B were treated with Metformin compared to group A (91.9% vs 82.2%;  $p>0.001$ ). The two groups did not differ in the proportion of women treated with basal insulin, bolus insulin, and those with excessive gestational weight gain. In the third trimester, the reduction in HBA1c was similar between group A and group B ( $-1.06\%$  vs  $-1.16\%$ ;  $p=0.219$ ). However, more patients in group B achieved target HBA1c of  $\leq 6.5\%$  compared to group A (81.7% vs 75.7%;  $p=0.015$ ). Continuous glucose monitoring (CGM) was used in only 4.5% of the women in Group B and none of the women in Group A.

**Conclusion:** After the implementation of the CCPC, more women with T2D are achieving glycaemic targets. More analysis will follow on pregnancy outcomes.

## **P29- Integrated care for women with type 2 diabetes mellitus (T2D) during pregnancy reduces complications.**

**Naglaa Alsharkawa, Ifrah Hassan, Eman Othman, Annama Joseph, Nahad Alalwai, Lubna Dagash, Ahlam Alsaadi, Nassema Alouche, Khaled Baagar, Hamda Ali, Naela Almalahy, Nour Al-Shaybani, Fatima Asheer, Fatin El-Taher, Mohammed Bashir.**

*National Diabetes Centre- Women Wellness and Research Centre-HMC-Doha, Qatar*

**Background:** - Women with T2D during pregnancy are at higher risk of complications, including pregnancy-induced hypertension (PIH), pre-eclampsia (PET), large for data (LFD), macrosomia, shoulder dystocia, C-section, and Intrauterine fetal death (IUFD). The Clinical Care Program (CCPC) provides structured, evidence-based, multidisciplinary integrated care for women with T2D during pregnancy who attend the National Diabetes Centre- Women Wellness and Research Centre.

**Objectives:** To compare the pregnancy outcomes of women with T2D before and after implementing the CCPC.

**Methods:** This retrospective study included 383 women (group A) who attended the service before 2016 and 850 women (group B) who attended the service after 2016.

**Results:** The baseline characteristics were reported elsewhere. More patients in group B achieved target HBA1c of  $\leq 6.5\%$  compared to group A (81.7% vs 75.7%;  $p=0.015$ ). The proportion of women with PIH and PET was lower in group B compared to group B (9.6% vs 15.0%;  $p=0.006$ ) and (5.1% vs 8.4%;  $p=0.022$ ), respectively. The proportion of women with LGA was lower in group B compared to group A (16.0% vs 23.2%;  $p=0.009$ ). There was no difference in the rates of primary C-section, preterm delivery, macrosomia, SFD and IUFD between the two groups. After adjusting for age, DM duration, first trimester HBA1c, last trimester HBA1c, BMI, gestational weight gain and Metformin, the odds of LGA, PIH and PET were lower in group B compared to group A (0.63 [95% CI 0.45-0.89];  $p=0.009$ ), (0.39 [95% CI 0.25-0.62];  $p<0.001$ ), and (0.48 [95% CI 0.27-0.84];  $p=0.011$ ) respectively.

**Conclusion:** Implementing CCP is associated with better glycaemic control and lower LGA, PIH, and PET risks.

### **P30- Impact of Continuous Glucose Monitoring on Maternal and Fetal Outcomes in Pregnant Women with Type 1 Diabetes Mellitus - A Retrospective Study**

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- 4- Leicester University, Leicester, England

**Background:** Type 1 diabetes mellitus (T1DM) is associated with adverse fetomaternal outcomes. Continuous glucose monitoring (CGM) during pregnancy is associated with better

glycemic control in T1DM. However, no clear benefits have been demonstrated in reducing adverse fetomaternal outcomes in pregnant women with T1DM.

**Objectives:** The objective of the study was to assess the impact of CGM on glycemic control and maternal and fetal outcomes in pregnant women with T1DM.

**Methods:** This is a retrospective, single-centre study of T1D women with pregnancy lasting 24 weeks or more who started attending the NDC-WWRC clinic at or before 15 weeks of gestation between January 1st 2015 and October 30th 2021.

**Results:** Of 265 women with T1DM, 92 (34.7%) used CGM, and 173 (65.3%) used capillary blood glucose (CBG) monitoring. The mean (SD) age and BMI at the first visit were 29.4 (4.7) years and 27.2 (5.2) kg/m<sup>2</sup>, respectively. The mean (SD) HbA1c in the first trimester was 7.9 (1.4) %, and in the last trimester was 6.9 (1.1) %. There was no difference in the mean change in HbA1c between the two groups (-0.9% vs. -1.1%; p=0.2). Women using CGM had lower insulin requirements (1.02 + 0.37 vs. 0.87 + 0.04 units/kg, p=0.01). The proportion achieving the HbA1c target (<6.5%) during the last trimester, excessive GWG, pregnancy-induced hypertension, pregnancy-induced toxemia, preterm labour, did not differ between the two groups. Neonatal weight, fetal weight percentiles, birth injury, stillbirth, and neonatal ICU admissions were similar between the two groups (Table 1). The mean (SD) time-in-range (TIR) improved from 44.2 ± 15.3% in the first trimester to 53.8 ± 18.2% in the last trimester, and time-below-range (TBR) improved from 13.4 ± 8.5% to 8.8 ± 7.1%.

**Conclusion:** CGM use in pregnant T1DM women can lead to improvement in TIR without a concomitant increase in the risk of hypoglycemia. CGM use was not associated with improved fetomaternal outcomes. More extensive prospective studies are needed to evaluate the impact of CGM use on fetomaternal outcomes in pregnant T1DM women.

## **P31-Emerging Patterns of Fulminant Type 1 Diabetes: Insights from a Middle Eastern Cohort**

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**Background:** Fulminant Type 1 Diabetes (FT1D), a subtype of diabetes mellitus characterised by severe beta-cell destruction and rapid onset, is an understudied entity, especially in the Middle East.

**Objectives:-** To evaluate the prevalence, clinical characteristics and outcomes of FT1D in comparison to classic Type 1 Diabetes (CT1D) in Qatar.

**Methods:** Retrospective study of all patients with newly diagnosed T1D admitted with diabetic ketoacidosis (DKA) from January/2015- August/2021 in Qatar. Patients were grouped into FT1D and CT1D based on pre-specified biochemical and clinical criteria.

**Results:** Of the 242 patients, 2.5% fulfilled the FT1D diagnostic criteria. FT1D patients were younger (median age 4 years vs. 15 years in CT1D) (Table 1). Gender distribution in FT1D was equal, whereas the CT1D group showed a female predominance (57.6%). FT1D patients had a mean C-peptide of  $0.11 \pm 0.09$  ng/ml (vs.  $0.53 \pm 0.45$  ng/ml in CT1D). FT1D patients had a median length of stay (LOS) of 1 day (1-2.2) and a DKA duration of 11.25 h (11-15). The median (length of stay) LOS and DKA duration in CT1D patients were 2.5 days (1-3.9) and 15.4 hours (11-23), respectively. The FT1D subset primarily consisted of moderate (83.3%) and severe (16.7%) DKA, whereas classic T1D had 25.4% mild, 60.6% moderate, and 14% severe DKA cases. FT1D was associated with a higher median white cell count ( $22.3 \times 10^3/\mu\text{L}$ ) at admission compared to classic T1D ( $10.6 \times 10^3/\mu\text{L}$ ). ICU admission was needed for 66.6% of FT1D patients, compared to 38.1% of classic-T1D patients. None of the patients in the FT1D group had mortality, while two died in the classic-T1D group.

**Conclusions:** Our findings illustrate the presence of FT1D in the Middle East and its distinctive clinical course. Despite more severe initial presentations, FT1D is not associated with worse short-term or long-term outcomes compared to classical T1D.

### **P32-The Prevalence of Macro And Microvascular Complications Among Adult Patients With Type 1 Diabetes In Qatar-A Cross-Sectional Study.**

**Shahd I. Ibrahim<sup>1</sup>, Ahmed E. Osman<sup>2</sup>, Gokhan Demir<sup>2</sup>, Mariam Imran<sup>2</sup>, Abdallah Al-Muhtaseb<sup>2</sup>, Abdelaziz Abusal<sup>2</sup>, Arwa A. Alsaud<sup>1</sup>, Layla Al-Hail<sup>1</sup>, Dabia Al-Mohanadi<sup>1</sup>, Mahmoud Zirie<sup>1</sup>, Abdul-Badi Abou-Samra<sup>1</sup>, Mohammed Bashir<sup>1</sup>**

1- Qatar Metabolic Institute, HMC

2- Internal Medicine Department-HMC.

**Background:** Qatar has the fourth highest incidence of type 1 diabetes mellitus (T1D) after Finland, Sweden, and Saudi Arabia. In addition to the higher risk of microvascular complications, people with T1D have a greater mortality risk secondary to cardiovascular disease (CVD). To our

knowledge, no previous studies have examined the prevalence of macro and microvascular disease among people with T1D.

**Objectives:** In this analysis, we aim to report the prevalence of retinopathy, diabetic neuropathy, albuminuria, chronic kidney disease (CKD) and CVD among people with T1D who attend the National Diabetes Centre (NDC), Hamad General Hospital (HGH).

**Methods:** This was a retrospective cross-sectional study. Data were collected from the electronic medical records. We included all people with T1D, aged 14 years and above, who attended  $\geq 2$  clinics in the NDC-HGH and had at least one complete laboratory work.

**Results:** We included 774 patients; 50.9% were females, and 71.8% were Qatari. The mean $\pm$ SD of age was 32.3  $\pm$  10.7 years, BMI was 27.6 $\pm$  6.1 kg/m<sup>2</sup>, HbA1C was 8.7 $\pm$  1.8%, and diabetes duration was 17  $\pm$ 9.1 years. The prevalence (95% CI) of retinopathy, albuminuria and neuropathy were 25.2% (22.2-28.4%), 57.9% (54.1-61.6%), and 0.9% (0.7-1.1%), respectively. In contrast, the prevalence (95%CI) of CKD (stage 3a -5) and CVD were 8.2% (6.3-10.5%) and 3.9% (2.6-5.5%), respectively.

**Conclusion:** The complication rates in our T1D population are similar to other cohorts. People with T1D have a high prevalence of microvascular complications but a lower prevalence of macrovascular complications.

### **P33-Poor Agreement Between Two Widely Used Cardiovascular Risk Scores in People with Type 1 Diabetes in Qatar.**

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**Background:** Cardiovascular disease (CVD) is a significant cause of morbidity and mortality in people with T1D. Accurate assessment of CVD risk is crucial for early intervention. The American College of Cardiology/American Heart Association (ACC/AHA) Atherosclerotic Cardiovascular Disease (ASCVD) risk score calculator is a widely used tool for estimating CVD risk and deciding whether to use statins as primary prevention. A new CVD risk score (STENO) has been developed for people with T1D.

**Objectives:-** We aim to assess the performance of both scores in people with T1D in Qatar.

**Methods:** This is a retrospective cross-sectional study. Data was collected from electronic medical records. For this analysis, we included all people with T1D, aged 14 years and above, who attended  $\geq 2$  clinics in the NDC-HGH, had at least one complete laboratory work, and had

no history of CVD. We calculated each patient's ASCVD risk scores using the ACC/AHA and STENO online calculators. We used the kappa coefficient to compare the agreement between the two risk scores.

**Results:** We included 744 people with T1D, 71.5% were Qatari, and 50.7% were males. The mean±SD of age was 31.8±10 years, T1D duration was 17.3 ± 9 years, HBA1c was 8.6 ±1.8% and BMI was 27.4± 6.0 kg/m<sup>2</sup>. The ACC/AHA engine categorised 96%, 3.3% and 0.7% as low, medium and high risk, respectively. The STENO engine categorised 68.4%, 19.1% and 12.5% as low, medium and high risk, respectively. The Kappa coefficient showed a low agreement rate between the two-risk scores [Agreement 69.4%, Kappa coefficient 0.09 (95% CI 0.05-0.13)].

**Conclusion:** The STENO risk score classified more patients as medium and high risk than the ACC/AHA ASCVD risk score. Prospective validation of both scores is needed in the Qatari population.

### **P34-The Performance of Two Risk Scores for End-Stage Kidney Disease in People with Type 1 Diabetes in Qatar**

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**Background:** Both the incidence and prevalence of chronic kidney disease (CKD) are increasing in people with T1D. Risk calculators are valuable tools for early detection and prevention of End Stage Kidney Disease (ESKD). The NICE guidelines recommend using the Kidney Failure Risk Equation (KFRE) for risk assessment in all people with kidney disease.

The STENO ESKD risk engine has been developed and validated in people with T1D.

**Objectives:-** We aimed to assess the performance of both scores in people with T1D in Qatar.

**Methods:** This is a retrospective cross-sectional study. Data was collected from electronic medical records. For this analysis, we included all people with T1D, aged 14 years and above, who attended ≥ 2 clinics in the NDC-HGH, had at least one complete laboratory work and had no history of ESKD. We used the kappa coefficient to compare the agreement between the two risk scores.

**Results:** We included 746 people with T1D, 72.2% were Qatari, and 50.5% were males.

The mean±SD of age was 32.0±10.7 years, diabetes duration was 17.3 ± 9 years, HBA1c was 8.7±1.8%, and BMI was 27.5±6 kg/m<sup>2</sup>. The KFRE classified 5.2% of the population as high risk, while the STENO-ESKD classified 3.2% as high risk. The Kappa coefficient showed a low

agreement rate between the two-risk scores [Agreement 92.8%, Kappa coefficient 0.11 (95% CI 0.005-0.23)].

**Conclusion:** We report a low agreement between two ESKD risk engines for people with T1D. Future Prospective studies are required to assess the performance of these risk engines in the Qatari population.

### **P35- The epidemiology of acromegaly, its cardiovascular correlates & comorbidities in Qatar: A prima facie analysis**

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**Background:** Acromegaly is a rare endocrine disorder with an estimated incidence of six to eight per million. It is caused by excessive growth hormone secretion, which results in systemic complications. The epidemiology of acromegaly in Qatar is unknown.

**Objectives:** To present the clinical and demographic features and management of the first-ever series of patients with acromegaly from Hamad Medical Corporation in Qatar.

**Method:** A cross-sectional study was conducted between 2015 and 2023, involving collecting and analysing data from medical records, patient registries, and national health databases in Hamad Medical Corporation.

**Results:** We identified 57 acromegaly cases, of whom 35 (63.6%) were males with a mean age of 45.9±11.2 years. Most had macroadenomas (n=38, 73.1%), while 6 (10.5%) had microadenomas. A total of 46 cases (82.2%) underwent surgery, 27 (55.1%) locally at HMC, and 22 (44.9%) outside Qatar, from which only 7 had a histological report. Only six patients (10.5%) received irradiation. There were 12 (21.8%) Qataris, 10 (18.2%) non-Qatari Arabs, 14 (25.5%) South Asians, 14 (25.5%) Africans and the remainder were of other nationalities. Those who underwent surgery had significantly elevated IGF-1 levels compared to those who did not, although not all of the latter group had available IGF-1 levels. Of the cohort, 29 (53.7%) still have active disease, 17 (31.5%) have non-active disease, and disease activity is not known in 8 (14.8%). Of the whole cohort, 46% are hypertensive, 56% have diabetes mellitus, 27% suffer from dyslipidemia, 84% are obese (BMI> 30Kg/m<sup>2</sup>), 16.4% have electrocardiographic evidence of cardiac hypertrophy, and 4.3% have colonic disorders. Cardiovascular comorbidities and IGF-1, GH, TFTs, gonadal steroids and ACTH levels were not associated with cardiovascular comorbidities. Paradoxically, there was an association between low IGF-1 levels and cardiac hypertrophy.

**Conclusion:** In summary, this is one of the most extensive series of patients with acromegaly from the Gulf region and shows a high prevalence of cardiovascular risk factors in patients with acromegaly. Further detailed analysis of this cohort and longitudinal follow-up will provide important insights into the management of acromegaly in the region.

## **P36-High prevalence of thyroid nodules and thyroid cancer in a cohort of patients with acromegaly from Qatar. A preliminary report**

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**Background:** Acromegaly, a rare endocrine disorder characterised by excessive secretion of growth hormone (GH) and insulin-like growth factor-1 (IGF-1), is associated with various comorbidities, including an increased risk of thyroid nodules and cancer. This association's pathophysiology involves the mitogenic and anti-apoptotic effects of GH and IGF-1 on thyroid follicular cells. Despite the recognition of this link, epidemiological data on thyroid pathology in patients with acromegaly, particularly from the Gulf region, remain limited. Therefore, this study aims to investigate the prevalence of thyroid nodules and cancer in a cohort of patients with acromegaly in Qatar.

**Objectives:** To Assess the prevalence of thyroid nodules and thyroid cancer among patients diagnosed with acromegaly in Qatar. --> Investigate potential risk factors associated with the development of thyroid nodules and cancer in individuals with acromegaly

**Methods:** A cross-sectional study was conducted between 2015 and 2023 involving collecting and analysing data from medical records, patient registries, and national health databases in Hamad Medical Corporation.

**Results:** In our study cohort consisting of 57 patients diagnosed with acromegaly, we observed a notable prevalence of thyroid nodules and thyroid cancer. Specifically, 20 individuals, constituting approximately 35.1% of the cohort, were diagnosed with thyroid nodules. These diagnoses were established through thorough assessments using high-resolution ultrasonography, a reliable imaging modality known for accurately detecting thyroid abnormalities. Furthermore, our investigation revealed that a subset of patients within the cohort, comprising seven individuals (approximately 12.3%), exhibited differentiated thyroid cancer of the papillary type upon histopathological examination. This finding underscores the significance of conducting comprehensive histopathological evaluations to precisely

characterise thyroid abnormalities, especially in individuals with acromegaly who may be at an increased risk for such conditions.

**Conclusion:** In conclusion, our preliminary report underscores the substantial prevalence of thyroid nodules and cancer among patients with acromegaly in Qatar. These findings emphasise the need for increased awareness, surveillance, and multidisciplinary management strategies to address the heightened risk of thyroid pathology in this patient population.

### **P37- Factors Predicting Malignancy in Patients with Indeterminate Cytology on Fine Needle Aspiration Biopsy of Thyroid Nodules**

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**Background:** Optimal management strategies for patients with indeterminate cytology (Bethesda III/IV) on thyroid fine needle aspiration biopsy (FNAB) remain elusive, especially when molecular testing is unavailable. The risk of malignancy in these patients ranges from 5% to 30%. Hence, a significant number of these patients have benign nodules, and appropriate risk stratification strategies may help prevent unnecessary surgeries and potential complications.

**Objective:** We aimed to assess factors predicting malignancy in patients with indeterminate cytology on thyroid nodule FNAB.

**Methods:** In this retrospective study, we included consecutive patients with indeterminate cytology on FNAB of thyroid nodules at Hamad Medical Corporation, Qatar, between 01/01/2015 and 30/08/2023, who were surgically managed. We used descriptive statistics, chi-square test, t-test and logistic regression to analyse the data.

**Results:** A total of 449 patients were included in the study. The majority were females (N = 324, 72.2%). The mean (SD) age was 43.7 +/- 10.7 years. Arab was the most common ethnicity (N = 254, 56.6%), followed by South Asian (N = 85, 18.9%) and South-East Asian (N = 80, 17.8%). The ATA sonographic pattern of thyroid nodules was as follows: very low suspicion (4, 0.9%), low suspicion nodules (216, 49.1%), intermediate suspicion (185, 42.05%) and high suspicion (35, 7.95%). 387 (86.2%) patients had Bethesda III, whereas 62 (13.8%) had Bethesda IV cytology results. 179 (39.9%) had malignancy on histopathology of thyroidectomy specimens, of which 146 (81.6%) had papillary thyroid cancer (PTC). Patients with intermediate suspicion sonographic pattern (p = 0.001), high suspicion (p = 0.002), and Bethesda IV on FNA cytology (p = 0.04) were more likely to have malignant histopathology. In multivariate logistic regression analysis, ATA intermediate suspicion (OR = 1.57 [1.03-2.4], p = 0.03) and high suspicion (OR = 3.92 [CI 1.81-8.48], p = 0.001) sonographic patterns were predictive of malignancy.

**Conclusion:** In patients with indeterminate cytology on thyroid nodule FNAB and in the absence of molecular testing, ATA sonographic pattern can guide decision-making to identify patients at greater risk of malignancy in whom surgery may be justified and to avoid surgery in patients with low risk of malignancy.

### **P38- Prevalence and Correlates of Night Eating Syndrome, Insomnia, and Psychological Distress in Primary Care Patients with Obesity: A Cross-Sectional Study**

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**Background:** Obesity management is challenging for both patients and healthcare workers. Considering the low success rate of current interventions, this study aimed to explore the prevalence and predictors of night eating syndrome (NES), insomnia, and psychological distress among individuals with obesity to plan comprehensive management interventions.

**Method:** A cross-sectional study on a convenient sample from five primary healthcare centres in Port Said, Egypt, was conducted from November 2020 to March 2021. Socio-demographic and clinical characteristics were collected in addition to the assessment of NES, insomnia, and psychological distress using the Arabic versions of the Night Eating Diagnostic Questionnaire (NEQ), the Insomnia Severity Index (ISI), and the Patient Health Questionnaire -4 (PHQ-4) scales, respectively. Predictors of NES, insomnia and psychological distress were assessed by multiple regression analysis. A *p*-value less than 0.05 was considered statistically significant.

**Results:** We included 425 participants with obesity with a mean age of  $45.52 \pm 6.96$  years. 54.4% were females, and the mean body mass index (BMI) was  $35.20 \pm 4.41$  kg/m<sup>2</sup>. The prevalence rates of NES, insomnia, and psychological distress were 21.6% (95% CI: 17.7 – 25.6%), 15.3% (95% CI: 11.9 – 18.7%), and 18.8% (95% CI: 15.1 – 22.6), respectively. NES was significantly associated with physical inactivity (OR 0.491, *p*=0.012), nonalcoholic fatty liver disease (NAFLD) (OR 2.080, *p*=0.047), insomnia (OR 2.265, *p*=0.014), and psychological distress (OR 2.548, *p*=0.002). Strong predictors for insomnia included NAFLD (OR 2.820, *p*=0.018), NES (OR 2.194, *p*=0.023), and psychological distress (OR 5.977, *p*<0.001). The only predictors of psychological distress symptoms were insomnia (OR 5.886, *p*<0.001) and NES (OR 2.486, *p*=0.003).

**Conclusion:** The prevalence rates of NES, insomnia, and psychological distress were high among patients with obesity, and these conditions were interrelated. Optimal obesity management necessitates individualised and targeted multidisciplinary care plans that consider patients' mental, behavioural, and dietary habits needs.

### **P39- A comparative analysis of glycemic control during continuous enteral versus bolus feeding in hospitalized patients with diabetes - a retrospective cohort study**

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**Introduction:** Diabetes mellitus (DM) management in hospitalized patients on enteral nutrition (EN) is complex. The appropriate method of EN nutrition, bolus or continuous EN, is still under debate.

**Objective:** We aimed to evaluate the glycemic outcomes of patients with DM, who were managed with either bolus or continuous EN regimens.

**Methods:** This retrospective study involves hospitalized patients on EN in Hamad General Hospital (HGH) and Al Khor Hospital (AKH) between January 1, 2015, to December 31, 2021. Hypoglycemia was defined as blood glucose (BG)  $\leq 3.9$  mmol/L. Category 1 hyperglycemia was defined as  $BG \geq 13.8$  mmol/L to  $< 19.4$  mmol/L, and category 2 hyperglycemia as  $BG \geq 19.4$  mmol/L.

**Results :** A total of 94 patients were included in the study. 37 (41.5%) patients were managed with bolus EN, and 55 (58.5%) with continuous EN. Patients on bolus EN were younger compared to continuous EN (Median 71 (62-81) vs 79 (71-83);  $p = 0.03$ ). There were no differences in terms of gender ( $p = 0.8$ ), ethnicity ( $p = 0.1$ ), types of insulin regimens ( $p = 0.3$ ), baseline hbA1c (Median [IQR] 7.5 [6.3-8]% vs. 7 [6.5-6.8]%,  $p = 0.4$ ), daily insulin requirements (Median [IQR] 25 [10-40] units vs. 18 [10-28] units,  $p = 0.2$ ), and average fasting glucose (Mean  $\pm$  SD of  $8.9 \pm 2.9$  mmol/L vs.  $8.2 \pm 3$  mmol/L,  $p = 0.29$ ) between the two groups. The two groups also had a similar number of patients developing category 1 ( $p = 0.42$ ) or category 2 ( $p = 0.27$ ) hyperglycemia. No differences were noted in the number of patients developing hypoglycemia episodes ( $p = 0.27$ ).

**Conclusion:** There are no differences in terms of glycemic outcomes between DM patients managed with bolus or continuous feedings.

### **P40- Comparison in body composition analysis between type 2 diabetic patients with or without diabetic neuropathy**

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**Introduction:** DPN is one of the most common DM complications. Many studies have been done to look for the risk factors and associations with DPN.

**Objectives:-** To explore the relationship between DPN and body composition data.

**Methods:** 124 diabetic patients aged 30 – 75 were recruited and underwent CCM, VPT, bio-impedance analysis, and the DN4 questionnaire. Body composition was compared between patients with and without DPN and the associations with body composition were investigated.

**Results:** Among the 124 patients, 16.5 % were categorised as DPN (+), and 83.5 % were DPN (-); a significant difference in CNFL, CTBD, VPT and DN4 was observed between the two DPN (P = 0.015, P = 0.043, P < 0.001 and P < 0.001 respectively). Comparison in body composition shows a significant difference between the two groups in percent body fat (P = 0.003), intracellular water (P = 0.025) and skeletal muscle mass (P = 0.043) after adjusting to age and gender.

Percent body fat (OR, 0.8, 95% CI, 0.736 – 0.96, P = 0.01) skeletal muscle mass (OR, 1.107, 95 % CI, 1.002 – 1.223, P = 0.46) and intracellular water value (OR, 1.175, 95 % CI, 1.018 – 1.355, P = 0.028) are associated with DPN.

**Conclusion:** DPN is associated with percent body fat, skeletal muscle fat, and intracellular water. There is a significant difference in body composition between patients with and without DPN.

## **P41-The outcome and the clinical characteristics of the Newly Diagnosed Type 2 Diabetes Mellitus after COVID-19 infection in Qatar**

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**Background:** It has been discovered that COVID-19 infection can make underlying diabetes worse or cause new-onset diabetes. This happens when the virus enters pancreatic beta cells and impairs insulin production. The new diabetes can either be permanent or temporary. For instance, in Qatar, 5% of COVID-19 patients had diabetes, and 2/3 of those cases were newly diagnosed.

**Objectives:** To determine the percentage and clinical characteristics of diabetes remission in a cohort of newly diagnosed type 2 diabetes mellitus patients after COVID-19 in 2020.

**Methods:** We searched HMC records for COVID-19 patients with newly diagnosed diabetes (HbA1c  $\geq$  6.5%), no previous diabetes history, and no prior antidiabetic medication use. We followed them until the data collection date (1-2 years of follow-up) and included only those with HbA1c follow-up results. Primary outcome: diabetes remission (HbA1c  $<$  6.5%) without antidiabetic medication use.

**Results:** The study included 129 patients with NDDM. The average age of the cohort was 45.1 years, and the mean BMI was 29.7 kg/m<sup>2</sup>. The majority of the cohort was male (85.2%). The percentage of diabetes remission was 15%. The remission group had significantly lower blood glucose and HbA1c levels during COVID-19 infection than the non-remission group (. No significant differences were found between the two groups regarding other clinical characteristics or laboratory values.

**Conclusion:** The percentage of diabetes remission in our cohort is 15%, lower than the 40% reported in the literature, possibly due to a high loss of follow-up.

## **P42- Impact of Distal Pancreatectomy on Diabetes Mellitus: A Single-Center Retrospective Study.**

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**Background:** Distal pancreatectomy (DP) is a standard procedure for treating pancreatic diseases but can significantly impact blood sugar levels.

**Objectives:-** To assess the occurrence of new-onset diabetes mellitus (NODM) or worsening of diabetes mellitus (DM) following DP.

**Methods:** We retrospectively reviewed DP cases over 13 years at Hamad General Hospital, Qatar. Patients were categorised based on HbA1c levels: nondiabetics ( $<$ 5.6), prediabetics (5.7-6.4), and known DM ( $\geq$ 6.5 or on antidiabetic medications). NODM was defined as HbA1c  $>$ 6.5 in previously nondiabetic or prediabetic patients, and worsening of DM was defined as an HbA1c increase of 0.5 or medication escalation. The median follow-up was four years.

**Results:** Of 70 DP cases, 48 had appropriate investigations. Nondiabetics had a 12% NODM rate, prediabetics 62%, and known DM patients 78% worsening of DM post-DP. Prediabetics were 5.2 times more likely to develop NODM (RR=5.2,  $p=0.010$ ), and known DM patients were 6.6 times more likely to worsen (RR=6.6,  $p=0.0052$ ). No significant difference was found between known DM and prediabetics in worsening DM or NODM (RR=1.2,  $p=0.35$ ).

**Conclusions:** NODM or worsening of DM is common after DP. Preoperative HbA1c screening is crucial for identifying high-risk patients. Regular postoperative HbA1c monitoring and endocrinology follow-up are recommended for DP patients to manage this complication effectively.

### **P43- Impact of Morbid Obesity (BMI $\geq$ 40) on Pregnancy Outcomes: A Retrospective Analysis of Postpartum Hemorrhage, Birthweight, and Preterm Delivery at Al Wakra Hospital**

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**Background:** Obesity poses significant challenges in maternal health globally, with pregnancy complications being a major concern. This study delves into the impact of maternal Body Mass Index (BMI) on postpartum haemorrhage (PPH), birthweight, and preterm delivery, focusing specifically on women with morbid obesity (BMI  $\geq$  40) delivering at Al Wakra Hospital.

**Methods:** A retrospective analysis used data from Al Wakra Hospital's electronic medical records between January 2022 and October 2023. The study included 1860 deliveries categorised into two BMI classes: Class 2 obesity (BMI 35.0–39.9, n=1369) and Class 3 obesity (BMI  $\geq$  40, n=491). We analysed the occurrences of PPH (defined as blood loss  $\geq$  1000 ml after Cesarean section delivery and  $\geq$  500 ml after normal delivery), macrosomia (birthweight  $\geq$  4000 grams), and preterm delivery (delivery before 37 weeks gestation) using Chi-square tests. Statistical significance was set at  $p < 0.05$ .

**Results:** The incidence of PPH was 0.66% (9 cases) in Class 2 and 0.41% (2 cases) in Class 3 obesity respectively ( $p=0.0043$ ). Neonatal birthweight  $\geq$  4000 grams occurred in 5.70% (78 cases) of Class 2 and 7.13% (35 cases) of Class 3 obesity respectively ( $p=0.265$ ). Preterm delivery rates were 4.52% (62 cases) in Class 2 and 6.74% (33 cases) in Class 3 obesity respectively ( $p=0.021$ ).

**Conclusion:** Women with class 3 obesity have a lower incidence of PPH but a higher prevalence of high birthweight deliveries and preterm deliveries compared to class 2 obesity. These findings have important implications for screening and care of morbidly obese pregnant women to try to decrease adverse outcomes.

## **P44- Association Between Maternal BMI (Class 2 & 3) and Cesarean Section Rates in Primigravidae at Al Wakra Hospital**

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2- Department of Obstetrics and Genecology, Al Wakra Hospital, HMC.

**Background:** Obesity, particularly within the higher classes like class 2 (BMI 35.0–39.9) and class 3 (morbid obesity, BMI  $\geq$  40), is a growing public health concern impacting pregnancy outcomes, including potentially increasing cesarean section (C-section) rates.

**Objectives:-** To investigate this association specifically in primigravidae (first-time pregnant women) delivering at Al Wakra Hospital. Understanding this link is crucial for optimising care and birthing experiences for this population.

**Methods:** A retrospective analysis used data from Al Wakra Hospital's electronic medical records between January 2022 and October 2023. The study focused on primigravidae deliveries categorised into two specific BMI classes: Class 2 (BMI 35.0–39.9) and Class 3 (morbid obesity, BMI  $\geq$  40). We compared the rates of C-section deliveries between these groups using a Chi-square test. Statistical significance was set at  $p < 0.05$ .

**Results:** A total of 229 primigravidae deliveries were analysed: 176 women belonged to Class 2 and 53 to Class 3 obesity, respectively. The C-section rate in Class 2 was 20.45% ( $n = 36$ ), while in Class 3, it was 33.96% ( $n = 18$ );  $p$ -value = 0.0001.

**Conclusion:** This study investigated the association between maternal BMI (specifically Class 2 and Class 3 obesity) and C-section rates in primigravidae at Al Wakra Hospital. While the results suggest a higher C-section rate in the morbid obesity group (Class 3), the lack of adjustment for confounding factors limits the conclusiveness of the findings. Further research accounting for confounders is warranted to understand better the factors influencing C-section rates in primigravidae with higher BMI.

## **P45- Association between hyperglycaemia and cognitive dysfunction – a cross-sectional study based on the Qatar Biobank**

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**Background:** Diabetes mellitus, characterised by hyperglycaemia, is a major health problem globally, and its prevalence in Qatar is among the highest worldwide. However, hyperglycaemia's impact on the Qatari population's cognitive function has not been investigated.

**Objectives:** We aim to investigate the association between hyperglycaemia and cognitive function in a cohort of middle-aged and elderly individuals in Qatar.

**Methods:** We conducted a cross-sectional study on a cohort of middle-aged and elderly individuals (40 to 80 years old) who participated in the Qatar Biobank without known cognitive function diseases or stroke. Participants had data on glycaemic indices, including HbA1c, serum glucose, insulin, waist circumference, waist-hip ratio, and cognitive tests. All the participants underwent an assessment of cognitive function using the Cambridge Neuropsychological Test Automated Battery (CANTAB). Two tests were used: the paired episodic memory test (new learning and visual memory) and the reaction time test (motor and mental speed)

**Results:** 1000 participants were enrolled with a mean age of 49.77 years (SD= 6.67), of which 51.90% were female. In a multivariable linear regression, speed of reaction was associated with diabetes (beta 36.80, 95% CI 8.96 to 64.63,  $P < 0.01$ ), HbA1c (beta 10.73, 95% CI 0.89 to 20.58,  $P < 0.05$ ), waist circumference (beta 1.70, 95%CI 0.70 to 2.69,  $P < 0.001$ ) and waist-to-hip ratio (beta 252.56, 95% CI 71.456 to 433.67,  $P < 0.01$ ). Poor memory performance was associated with increased waist circumference (beta = 0.30, 95% CI -0.44, -0.15],  $P < 0.001$ ) and waist-to-hip ratio (beta = -54.41, 95% CI -80.62, -28.19],  $P < 0.001$ ). These findings demonstrate that a negative association between diabetes (and its biomarkers and anthropometric indices) and cognitive impairment, reported previously, also exists in middle-aged individuals.

**Conclusion:** In a cohort of middle-aged and elderly individuals in Qatar, diabetes, higher levels of HbA1C, and a waist-to-hip ratio were associated with worse new learning and visual memory performance and worse performance in motor and mental speed domains of cognitive function.

## **P46- Glycemic Outcomes Among Newly Diagnosed Type 2 Diabetes Mellitus Patients Presenting with Acute Coronary Syndrome – A Retrospective Study**

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**1-** Qatar Metabolic Institute, HMC

**2-** Internal Medicine Department, HMC

**Background:** Management of type 2 diabetes mellitus (T2DM) involves a stepwise approach, initiating oral antihyperglycemic agents (OHA) and intensifying insulin if needed. However, the addition of insulin to OHA is recommended in patients with blood glucose  $>300$  mg/dl or hbA1c  $>10\%$  at diagnosis.

**Objective:** To assess the glycemic outcomes at 1-year follow-up among new T2DM patients with an hbA1c  $>10\%$ .

**Methods:** This retrospective study of new T2DM patients with initial hbA1c >10% admitted with acute coronary syndrome (ACS) to Hamad Medical Corporation, Qatar, between January 1st 2020 and August 30th 2022. Group 1 included patients discharged on non-insulin agents, whereas group 2 included patients discharged on insulin ± non-insulin agents.

**Results:** A total of 62 patients fulfilled the eligibility criteria. The mean (SD) age was 46.9 ± 7.3 years. The majority were males (N = 58; 93.6%) and South Asians (N = 52 (93.9%). 48 (77.4%) belonged to (Group 1) whereas 14 (22.6%) were in Group 2. There were no differences in baseline lipid profiles between the two groups. In both groups, the majority were discharged on three oral agents (75% and 64.3%, respectively). At 1-year follow-up, there were no differences in change in hbA1c (Mean [SD] 4.4 ± 1.8 vs. 5.1 ± 2.4%, p = 0.07) and change in BMI (Mean [SD] -0.04 ± 3.7 vs. -0.3 ± 4.4, p = 0.8) between the two groups. More patients in group 1 achieved a target hbA1c of ≤7.5% than in group 2 (75% vs. 42.9%, p = 0.024). Patients in group 1 also had a lower total cholesterol (Median [IQR] 3.3 (2.6-4.4) vs. 4.6 (3.6-5.4) mmol/L, p = 0.02) and LDL (Median [IQR] 1.6 (1.2-2.7) vs. 3 (2-3.2) mmol/L, p = 0.01). There was no difference in the number of readmissions due to cardiac reasons. No hyperglycaemic/euglycemic emergencies were reported.

**Conclusion:** In patients with very high hbA1c who do not prefer insulin, a regimen consisting only of OHA is an acceptable alternative.

## **P47- Societal Health and Economic Burden of Cardiovascular Diseases in the Population with Type 2 Diabetes in Qatar. A 10-Year Forecasting Model**

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*5- School of Public Health and Preventive Medicine, Monash University, Melbourne, Australia.*

**Background:** Approximately half of the country's acute coronary syndrome cases and 70% of stroke patients have type 2 diabetes (T2D).

**Objectives:-** To forecast the health and economic burden of cardiovascular disease (CVD) in T2D in Qatar at the population level from 2023 to 2032.

**Methods:-** A dynamic multistate model was designed to simulate the progression of CVD events among people with T2D. The population's demographic profile was based on Qatari citizens and

residents with T2D aged 40-90 years based on 2022. First CVD events (i.e. myocardial infarction (MI) and stroke) were calculated via the 2013 Pooled Cohort Equation. To estimate the 10-year risk, variables were obtained from the Primary HealthCare Corporation (2016-2021). Recurrent CVD events were sourced from the global REACH registry (3). Model outcomes were fatal and non-fatal MI and stroke, years of life lived, quality-adjusted life years (QALYs), total direct medical costs, and total productivity loss costs. Utility and cost model inputs were drawn from published sources. The model adopted a Qatari societal perspective. Sensitivity analyses were performed to test the robustness of estimates.

**Results:** Model estimates 123,524 non-fatal MIs (95% uncertainty interval (UI) 116,923-130,065), 70,466 non-fatal strokes (95%UI 67,945-73,476) and 15,410 CVD deaths (95%UI 15,217-15,794), respectively. T2D population accrued 4,834,146 (95%UI 4,781,235-4,881,695) total years of life lived and 3,817,246 (95%UI 3,756,963-3,870,616) total QALYs. Direct costs accounted for 59.52% of the total costs, with a projection of QAR43.59 billion (95%UI 9.14-134.20 billion), while the total indirect costs were expected to exceed QAR29.65 billion, (95%UI 2.40-113 billion)

**Conclusion:** This study highlights that the considerable rising burden of CVD in T2D in Qatar will impact not only the healthcare system but also society overall. The findings may be used to prioritise strategies targeting T2D to prevent the burden of CVD.

## **P48- The effects of Sleeve Gastrectomy on the improvement and/or remission rates of Insulin resistance, Type-2 diabetes mellitus, Hypertension and Dyslipidemia at Mid-term follow-up post-surgery.**

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2- Internal Medicine Department-HMC

**Background:** Insulin Resistance (IR) is a major risk factor for cardiovascular diseases, which are the leading cause of death worldwide. Sleeve Gastrectomy (SG) induces remission and /or improves a variety of obesity-related comorbidities due to its effects on IR, gastrointestinal hormones—gastric Inhibitory Peptide (GIP), Glucagon-like Peptide-1 (GLP-1), Ghrelin, inflammatory markers, and the TWL % (total weight loss).

**Objectives:-** To study the rates of remission and/or improvement of diabetes, IR, hypertension, and dyslipidemia at midterm follow-up post-SG.

**Methods:** A prospective cohort study was conducted in bariatric medicine clinics at Hamad Medical Corporation. We included any patient eligible for SG and agreed to participate in assessing the cardio-metabolic risk factors pre-SG and post-SG at mid-term follow-up (3 –5

years). Parameters included comorbidities such as (dyslipidemia, hypertension, type-2 diabetes), medications, lipids profile, blood pressure, insulin, fasting glucose, HBA1C, and HOMA-IR (Homeostatic Model Assessment of Insulin Resistance). Disease status describes the standardised outcome reporting in metabolic and bariatric surgery –ASMBS.

**Results:** 48 patients were included; 16 patients have diabetes (33.3%), 33 patients have dyslipidemia (68.8%) and 15 have hypertension (31.3%). Mean± SD for the weight and Body Mass Index (BMI) pre-surgery were 123.9 and 45.9, respectively. Post SG nadir weight reached, and BMI means were 81.7±21 kg and 30.5 kg/m<sup>2</sup>. The TWL % was 33.4±10. Insulin and HOMA-IR-Mean± SD pre-SG were 32.0, 10.3 and post-SG 7.89 and 2.2 with significant P values (.000) (.000), respectively. Dyslipidemia resolution in 58.06% and improvement in 35.4 %, hypertension resolution in 62.28% and improvement in 35.71%, and diabetes remission in 71.42% and improvement in 28.57%.

**Conclusion:** SG can significantly decrease IR at mid-term follow-up. It induces remission and /or improvement in multiple cardiometabolic risk factors, so it can be used as an effective tool to reduce morbidity and mortality in high-risk patients.

## **P49-Exploring Healthcare Providers' Off-Label Use of GLP-1 Receptor Agonists for Weight Management: Qatar Perspective**

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**Background:** The off-label use of glucagon-like peptide-1 receptor agonists (GLP-1RAs) beyond their approved indications has attracted considerable interest, especially for managing obesity among healthcare providers (HCPs) without diabetes. GLP-1RAs are recognised for suppressing hunger and increasing feelings of fullness, thus emerging as a potential approach for weight reduction.

**Objectives:-** To ascertain the prevalence of off-label use of GLP-1RAs. To delineate the usage patterns, and to evaluate users' opinions regarding their safety and effectiveness.

**Methods:** This cross-sectional study employed a convenience sampling of HCPs from Qatar. A structured survey was distributed between September and December 2023, yielding 325 respondents. Our study focuses on healthcare providers who do not have diabetes and have employed GLP-1RAs exclusively for weight loss in the past year.

**Results:** Among the 325 participants, 85% (276) responded that they did not use GLP-RAs for off-label use, while 15% (49) acknowledged using them for off-label indications. The median age of the participants was 41 years (IQR:36-46), and the median BMI was 30 kg/m<sup>2</sup> (IQR: 28-35), with no significant difference between males and females. Doctors constituted 14% of the participants, allied health professionals 18%, and nurses formed the majority at 67%. Semaglutide emerged as the most popular weight-loss choice, preferred by 57% of respondents, followed by liraglutide at 31%. The other GLP-1 receptor agonists were chosen by less than 10% of the participants. Only 2% reported using GLP-1RAs based on doctors' recommendations, whereas friends or relatives influenced 45%. The perceived safety and effectiveness of GLP-1RAs were reported at 45% and 39%, respectively.

**Conclusion:** The study highlights the widespread use of GLP-1 RAs beyond their approved indications. It underscores the need for further research on the implications of off-label use, especially regarding safety, efficacy, and regulatory guidelines. This pioneering research calls for updates in policies and guidelines to reflect the real-world use of GLP-1 RAs among HCPs

## **P50- Multiple Comorbid influences on neurodegeneration: An analysis from the Qatar Biobank**

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**Background:** Multiple risk factors for neurodegeneration exist. We have assessed the role of type 2 diabetes (T2D), obesity, hypertension, hyperfibrinogenemia, and FT3 levels in central and peripheral neurodegeneration in Qatar Biobank participants.

**Methods:** A total of 337 adult Qatari nationals and long-term residents ( $\geq 15$  years) underwent clinical and metabolic assessments, corneal confocal microscopy (CCM), vibration perception threshold (VPT), the DN4 questionnaire for neuropathic pain, CANTAB cognitive function tests, and MRI for brain volume analysis.

**Results:** The cohort, aged  $43.4 \pm 12.8$  years, included 16.1% with T2D, 42.8% with obesity, 10.5% with hypertension, and 9.6% with hyperfibrinogenemia. Compared to nondiabetic individuals, those with T2D had a higher prevalence of hypertension (26.2% vs 6.5%,  $P < 0.0001$ ), lower FT3 levels (4.6 vs 4.8 pmol/L,  $P < 0.05$ ), but similar rates of obesity (45.2% vs. 41.8%,  $P = 0.69$ ) and hyperfibrinogenemia (13.2% vs. 8.7%,  $P = 0.30$ ). T2D was significantly associated with corneal nerve loss and elevated VPT ( $P \leq 0.0001$ ), neuropathic pain ( $P < 0.05$ ), increased white matter hyperintensities (WMH) ( $P = 0.05$ ), and reduced whole brain volume ( $P < 0.0001$ ), although these associations were not significant after adjusting for confounders. HbA1c levels fully mediated

the association between T2D with corneal nerve loss and neuropathic pain ( $P<0.05-0.0001$ ) but not for brain volume loss. Obesity and higher BMI were associated with reduced whole brain volume ( $P<0.01$ ) and neuropathic pain ( $P<0.05$ ), whilst hypertension lost its significant association with neurodegeneration after adjustment. Elevated systolic and diastolic blood pressure were associated with reduced reaction times on the CANTAB cognitive function tests and increased VPT (all  $P<0.05$ ). Hyperfibrinogenemia was associated with WMH ( $P<0.01$ ) but showed no significant association with other measures of neurodegeneration.

**Conclusions:** This study highlights the multiple risk factors for peripheral and central neurodegeneration in a relatively young Qatari cohort and advocates the need for an early and holistic approach to mitigate the risk of neurodegeneration.

## **P51- Pioglitazone for patients with type 2 diabetes admitted with COVID-19 infection.**

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2- Dasman Diabetes institute

3- University of Texas Health Science Center, San Antonio

**Background:-** The coronavirus SARS-CoV-2 causes COVID-19 and has emerged as a rapidly spreading communicable disease worldwide. Recent studies showed that people with diabetes mellitus, severe obesity, and cardiovascular disease are at a higher risk of mortalities from COVID-19. It has been suggested that the increased risk is due to the chronic inflammatory state associated with type 2 diabetes.

**Objectives:-** In this study, we aimed to evaluate the efficacy of pioglitazone, a strong insulin sensitiser with anti-inflammatory properties, in improving the clinical outcomes of patients with type 2 diabetes admitted with moderate-severe COVID-19.

**Methods:** We enrolled 343 patients with type 2 diabetes who were admitted with COVID-19 to hospitals in Qatar and Kuwait. Patients were randomised to receive in double-blind fashion therapy with placebo ( $n=155$ ) or pioglitazone ( $n=188$ ) for 28 days. The study had 2 primary outcomes: (1) the incidence of a clinical composite outcome of a) requirement for mechanical ventilation, b) death, c) myocardial damage, and 2) an increase in C-reactive protein (CRP).

**Results:** A total of 21 participants met the primary clinical composite outcome. There was no significant difference in the incidence of primary outcome between subjects receiving placebo ( $n=10$ ) and pioglitazone ( $n=11$ ). The Cox Hazard ratio for patients receiving pioglitazone was 1.10

(p=NS). A total of 4 individuals died in the placebo group vs 3 in the pioglitazone group (P =0.91). No statistically significant difference was observed between the two groups in plasma CRP level at the end of the follow-up.

**Conclusion:** The results of the present study demonstrate that pioglitazone treatment did not provide any additional clinical benefit to patients with type 2 diabetes admitted with COVID-19 infection.

## **P52-Optimizing Adrenal Vein Sampling (AVS) Accuracy in a Tertiary Care Centre in the Middle East.**

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2- Department, Hamad Medical Corporation

**Background:** Adrenal vein sampling (AVS) is critical in investigating primary aldosteronism, the most common cause of remediable secondary hypertension. AVS helps to localise functional adrenal lesions. AVS success rates vary significantly between different institutes and operators, which is multifactorial, including varying resources and expertise, different techniques, pre-procedure preparation of the patients, and variable patient demographics, among others. Although becoming a common procedure in the USA, successful AVS remains a challenge in the South Asian and Middle Eastern regions with a notable lack of expert centres.

**Objectives:** Describe our experience building a reliable regional service centre for AVS. Describe the patient's pre-procedure preparation prior to AVS. Statistical analysis of the procedures performed in HMC in the last five years.

**Methods:** This five-year retrospective review of AVS cases performed at Hamad Medical Corporation analysed patient demographics, data on procedural success rates, and complication rates. The study also evaluated the adequacy of pre-AVS patient preparations, including anti-hypertensive optimisation, cosyntropin administration, anaesthesia, and preprocedural cross-sectional imaging.

**Results:-** In 2019, we performed 29 cases of adrenal venous sampling. The average age of the patients is 46 years, of whom 65.5% are male. The average preprocedure Aldosterone level is 1155 pmol/L, and the average Aldosterone/Renin Ratio is 244. Pre-procedure imaging showed lateralisation in 82% of the patients. Overall, success rate is 79.9% (23/29 cases). However, for the last 15 patients, we achieved a success rate of 100% in keeping with developing a learning curve within the institute. 72% of the patients had lateralisation on AVS, of whom 75% underwent

surgical resection. The procedure is relatively safe, and we have not encountered severe adverse effects.

**Conclusion:** AVS is considered a safe procedure with life-changing possibilities. We show our experience optimising AVS pre-procedure preparation and technique to improve the success rate from 57% to 100% with minimal adverse effects.

## **P53-Longitudinal changes in painful diabetic peripheral neuropathy during COVID**

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**Background:-** No studies have assessed the natural history of painful diabetic neuropathy in relation to risk factors and especially the impact of COVID on type 2 diabetes.

**Methodology:** Participants with type 2 diabetes (n =55) underwent assessment of neuropathy (VPT) and painful diabetic neuropathy (DN4) across three visits over five years before, during and after the COVID epidemic.

**Results:** A significant difference was seen in DN4 score between 1st visit and second visit (P =0.004), between Female and male participants in the first visit (P =0.022) and second visit (P= 0.030) with higher prevalence in female participants, and between patients with and without long COVID (P= 0.031). At visit 1, the DN4 score was significantly correlated with physical activity (P =0.033) and VPT (P = <0.001). At visit 2 DN4 score was significantly correlated with HbA1c (P=0.030), BMI (P = <0.019) and VPT (P =0.014). At visit 3 DN4 score was significantly correlated with BMI (P = <0.001) and VPT (P = <0.001)

**Conclusion:** The DN4 score is related to gender, HbA1c levels, BMI, physical activity, and VPT. Female patients and patients with long COVID are at more risk for developing pDPN.

## **P54-Type 2 diabetes subgroups and response to glucose-lowering therapy: Results from the EDICT and Qatar studies**

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**Aim:** To examine the efficacy of glucose-lowering medications in subgroups of patients with type 2 diabetes mellitus (T2DM).

**Research design and methods:** Cluster analysis was performed on participants in the Qatar study using age, body mass index (BMI), glycated haemoglobin (HbA1c), and homeostatic model assessment of insulin resistance (HOMA-IR) and beta-cell function (HOMA- $\beta$ ). Participants also underwent an oral glucose tolerance test with measurement of plasma glucose, insulin and C-peptide concentrations to derive independent measures of insulin secretion and insulin sensitivity. The response to glucose-lowering therapies (change in HbA1c) was measured in each participant cluster for 3 years

**Results:** Three distinct clusters/groups of T2DM patients were identified. Participants in Group 1 had the highest HbA1c and manifested severe insulin deficiency. Participants in Group 3 had comparable insulin sensitivity to those in Group 1 but better beta-cell function and better glucose control. Participants in Group 2 had the highest BMI with severe insulin resistance accompanied by marked hyperinsulinaemia, which was primarily attributable to decreased insulin clearance. Unexpectedly, participants in Group 1 had better response to combination therapy with pioglitazone plus exenatide than with insulin therapy while participants in Group 2 responded equally well to both therapies despite very severe insulin resistance.

**Conclusion:** Distinct metabolic phenotypes characterize different T2DM clusters and differential responses to glucose-lowering therapies. Participants with severe insulin deficiency respond better to agents that preserve beta-cell function, while, surprisingly, patients with severe insulin resistance did not respond favourably to insulin sensitizers.

### **P55- Intradialytic Electrical Stimulation in Plantar Area Improves Mobility Performance in Diabetic Patient Undergoing Hemodialysis: A Randomized Controlled Trial.**

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**Background:** Hemodialysis (HD) patients often experience reduced physical activity, leading to sedentary lifestyles and impaired mobility. Intradialytic exercise interventions often encounter low patient compliance and adverse events. To address this, electrical stimulation (E-Stim), targeting the plantar region of the feet, is a simpler alternative.

**Objective:** To assess the effectiveness and feasibility of E-Stim in enhancing mobility with minimal patient effort compared to standard exercise programs for HD patients.

**Method:** This is a Randomized Controlled Trial; we recruited individuals with diabetes receiving HD aged 18 or older who could walk at least 10 meters independently with or without walking assistance devices and randomly assigned to intervention or control groups. The intervention group received 1-hour intradialytic electrical stimulation (i-ES) on the plantar area during HD sessions, while controls received a non-functional device for 12 weeks. Physical activity and mobility, along with patient-reported outcomes, were assessed using validated questionnaires and the technology acceptance model (TAM) to evaluate i-ES feasibility

**Results:** Out of 117 initial participants, 20 withdrew; 97 remained with no significant differences between the control and intervention group at baseline (age:  $53.97 \pm 13.04$  years; BMI:  $30.96 \pm 6.57$  kg/m<sup>2</sup>; female: 31.3%). Following the 12-week i-ES intervention, significant improvements were noted between the CG and IG groups and within baseline and follow-up assessments on stand-to-walk ( $p=0.018$ ,  $d=0.496$ ), sit-to-stand ( $p=0.021$ ,  $d=0.483$ ), stride time (dual-task:  $p=0.031$ ,  $d=0.449$ ; faster walking:  $p=0.032$ ,  $d=0.449$ ), and cadence (dual-task:  $p=0.029$ ,  $d=0.459$ ; faster walking:  $p=0.014$ ,  $d=0.514$ ). For the PROs, the main effect of time was found on cognitive function (+4.92%,  $p=0.008$ ), physical-related QoL (+7.14%,  $p<0.001$ ), and mental-related QoL (+5.54%,  $p=0.005$ ) significantly improved in the intervention group. Regarding feasibility outcomes, 83 participants completed the TAM questionnaire (response rate: 85.6%), with a greater willingness to use E-Stim therapy at home (65.9% vs. 35.7% in the control group).

**Conclusion:** The 12-week i-ES therapy is feasible and effective for improving mobility, cognitive functions, and QoL in HD patients, offering a low-risk alternative for those unable to join regular exercise programs.

## **P56- Impact of Weight Loss on Type 2 Diabetes Remission: Systematic Review, Meta-Analyses, and Meta-Regressions of Randomized Controlled Trials**

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**Background:** Overweight and obesity are prevalent among adults diagnosed with type 2 diabetes, and weight loss is closely associated with diabetes remission.

**Objective:** Compute the relationship between weight loss and diabetes remission, accounting for age, sex, race, duration of diabetes, insulin use, baseline A1C, body mass index (BMI), type of intervention, and proportion of weight loss while also quantifying their effect sizes.

**Methods:** This global systematic review, meta-analyses, and meta-regressions analysed randomised controlled trials (RCTs) examining the impact of weight loss on diabetes remission in adults with diabetes and overweight or obesity. Electronic databases (PubMed, Embase, and trial registries) were searched from inception to December 5, 2023. RCTs that reported mean weight loss achieved through lifestyle changes, medications, or surgery, along with the corresponding proportions of diabetes remission, were included. The pooled mean proportion of diabetes remission was categorised by the proportion of total body weight loss. Multivariate-adjusted risk ratios (RRs) were reported for the proportion of diabetes remission. PROSPERO registration: CRD42024497878.

**Results:** From 2,764 records, 26 low-bias RCTs were identified. Diabetes remission, partial or complete, was defined as A1C < 6.5% or 6.0%, respectively, measured at least one year following the intervention. Diabetes remission proportion by weight loss showed: <10% loss led to 1.3% complete and 5.3% partial remission; 10–19% loss to 32.9% complete and 40.3% partial; 20–29% loss to 50.0% complete and 66.6% partial; and ≥30% loss to 72.5% complete and 80.6% partial. Univariate linear regression revealed that each 1% weight loss increased complete and partial remission proportion by 2.38% and 2.60%, respectively. In multivariable meta-regression models, weight loss predicted both complete (adjusted R<sup>2</sup> 85.65%, RR 1.04, 95% CI: 1.02-1.07, p=0.001) and partial remission (adjusted R<sup>2</sup> 82.31%, RR 1.10, 95% CI: 1.04-1.15, p=0.001). The remaining factors did not influence diabetes remission.

**Conclusion:** Weight loss is the key factor in diabetes remission for patients with overweight/obesity, highlighting weight management's role in reducing diabetes' global health impact.

# **P57- Inter-population Variations in Response to Incretin-based Therapies Among Patients with Type 2 Diabetes: A Narrative Review**

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**Background:** In type 2 diabetes, the use of incretin-based therapies (glucagon-like peptide-1 receptor analogues and dipeptide peptidase-4 inhibitors) positively impacts glycemia and body weight in clinical trials and real-world studies. Understanding the effect of Ethnicity on treatment response is critical for the development of successful precision medicine.

**Objectives:** We have conducted a narrative review to evaluate the glycemic response variations to incretin-based therapies in various bio-geographic populations with type 2 diabetes (T2D) and explored the reasons behind these differences.

**Methods:** The literature search used PubMed and Google Scholar databases. Furthermore, snowballing was employed by examining the reference lists of the retrieved trials, systematic reviews, and meta-analyses; combinations of MeSH and keywords were used as search terms.

**Results:** our findings revealed that Asian populations respond more favourably to incretin-based therapies, particularly DPP-4 inhibitors, whereas other ethnicities revealed no significant difference. Despite the high prevalence of T2D in the MENA region, research on the Arab population's response to incretin-based therapies is limited, as most of the studies were small and retrospective, with a lack of head-to-head comparisons. The variability in incretin-based therapy response can be generally attributed to biological and environmental factors. In Asians, variable GLP-1 levels have been reported; East Asians with diabetes had lower intact GLP-1 levels, while South Asians had higher postprandial GLP-1 levels. Incretin-based therapies can increase adiponectin levels, which may potentially improve glycemic response in T2D patients with hypoadiponectinemia, particularly those with higher abdominal obesity, such as South Asians. Genetic variations may also play a role, as several gene variances have been identified as potential genetic biomarkers of treatment response to incretin-based therapies. These variants included GLP-1R SNPs (especially rs6923761), TCF7L2, PNPLA3, CDKAL1, KCNJ11, KCNQ1, and PRKD1.

**Conclusion:** Well-designed prospective studies are needed to determine if the observed differences in response to incretin-based therapies can be replicated in various populations, including the Arab population. Further research is needed to confirm whether the observed treatment response variations among different populations result from differences in genetics or other characteristics.

## **P58- Outcomes of Patients with Levothyroxine Overdose – A Systematic Review**

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**Background:** Levothyroxine (LTX) is a commonly used medication. Overdosage (O.D.) with LTX, is rare but can have deleterious and even life-threatening consequences. Data on clinical outcomes of patients with LTX OD is limited.

**Objectives:** To assess patients' clinical characteristics and outcomes with LTX OD.

**Methods:** We performed a systematic review of English-language articles via PubMed, Scopus, and Embase reporting primary patient data on LTX OD.

**Results:** A total of 47 articles were included in the analysis that included 95 patients, majority were females (41, 66.1%). The median age was 20 (3.5-42) years. Suicidal intent for LTX OD was reported in 46 (49.5%), while 57(50.5%) were accidental. Most patients took a single dose of LTX (31, 67.4%). The cumulative dose of LTX was 4250 (1250-10000) mcg. The median time to hospital presentation was 4.5 (1.5-24) hours, and the median time to symptoms onset was 48 (17-72) hours. The initial TSH at presentation was 0.76 (0.3-1.9) mIU/L, free T3 was 6 (5.2-10.7) pmol/L, and total T3 was 7.2 (3.4-29.8) nmol/L, free T4 was 65.7 (21.8-100) pmol/L and total T4 was 1067.5 (385-1560.5) nmol/L. The median time to normalise thyroid hormone levels was 13.5 (10-18) days. Beta-blockers was used in (31, 32.6%), followed by activated charcoal (27, 28.4%), steroids (17, 17.9%), antithyroid (9.5%) , and plasmapheresis in 7 (7.4%). Mortality was noted only in 1 (1.05%). Patients with LTX OD for non-suicidal intent/accidental were younger (Median (IQR) 3.5 (2.5-18) vs 35.5 (19-49),  $p = <0.001$ ), were more likely to report fever (29.8% vs. 8.7%,  $p = 0.01$ ) , palpitations (23.4 vs. 2.2,  $p = 0.004$ ), had a higher heart rate (Median (IQR) 119 (100-140) vs. 100 (85-120) per min,  $p = 0.02$  ),and higher total T3 (Media (IQR) of 23.3 (4.6-35) vs. 5.5 (2.3-7.2),  $p = 0.04$ ) than those with suicidal intent. There were no statistically significant differences in blood pressure, cumulative doses of LTX ingested, time taken to normalise thyroid hormone levels, treatment modalities, and mortality between the two groups.

**Conclusion:** Accidental LTX OD mainly occurs in children while intentional overdose occur in adults. The mortality rate in low with LTX OD.

# **P59- Effect of Microbiome-Modulating Therapies on Anthropometric Parameters and Blood Pressure in Metabolic Syndrome: A Systematic Review, Meta-Analysis, and Meta-Regression**

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**Background:** Central obesity, characterised by increased waist circumference (W.C.) >94 cm in men and >80 cm in women, and hypertension, defined by systolic (SBP) >130 mmHg and/or diastolic blood pressure (DBP) >85 mmHg, represent essential features of metabolic syndrome (MetS) according to the International Diabetes Federation. Microbiome-modulating interventions such as probiotics, prebiotics, synbiotics, and faecal microbiota transplantation (FMT) have emerged as promising adjunct therapies for ameliorating anthropometric parameters and blood pressure in patients with MetS.

**Methods:** We conducted a comprehensive systematic review, meta-analyses, and meta-regressions to assess the impact of these microbiome therapies on biomarkers of weight, W.C., body mass index (BMI), SBP and DBP. Our search included clinical trials published up to April 2023. Data synthesis involved random effects meta-analyses, presenting results as mean differences (M.D.s) and 95% confidence intervals (C.I.s), and univariate linear model meta-regressions.

**Results:** This study included 17 clinical trial comparisons, including 754 metabolic syndrome participants (386 intervention, 368 control/placebo). Our analysis unveiled that these adjunct therapies did not exert significant influences on DBP (MD: 0.27 mmHg, 95% CI: -1.82; 2.35,  $p=0.80$ ,  $I^2=67.4$ , 15 trial comparisons), SBP (MD: 0.17 mmHg, 95% CI: -2.81; 3.15,  $p=0.91$ ,  $I^2=52.6$ , 15 trial comparisons), or BMI (0.39 kg/m<sup>2</sup>, 95% CI: -0.17; 0.94,  $p=0.17$ ,  $I^2=97.4$ , 17 trial comparisons). However, statistically significant alterations were observed in W.C. (MD: -1.62 cm, 95% CI: -2.08; -1.17,  $p<0.01$ ,  $I^2=0.0$ , 13 trial comparisons) and weight (MD: -1.50 kg, 95% CI: -2.00; -1.00,  $p<0.01$ ,  $I^2=3.5$ , 15 trial comparisons). Age, baseline BMI, initial biomarker levels, pro/synbiotic dosage, trial duration, type of nutraceutical, and geographic region were

confounders. Substantial heterogeneity poses challenges for the clinical implementation of these interventions.

**Conclusion:** These findings indicate a potential role for microbiome-modulating therapies in ameliorating anthropometric parameters such as W.C. and weight in individuals with metabolic syndrome, although their efficacy in influencing blood pressure is limited.

## **P60- Does gut-microbiome therapy have a role in improving renal health in type 2 diabetes? A systematic review of clinical trials.**

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**Background & Objective:** Diabetes mellitus is a prevalent endocrine disorder worldwide, often leading to diabetic kidney disease (DKD), a significant contributor to end-stage renal disease. Despite numerous clinical trials investigating probiotics, prebiotics, and synbiotics to positively affect the gut microbiome and gut–kidney axis, consensus on their efficacy remains elusive. To address this gap, we conducted a multi-database systematic review to assess the impact of these interventions on renal health biomarkers in diabetes.

**Methods:** Following Cochrane Collaboration and PRISMA guidelines, we systematically screened and extracted data from relevant articles published up to April 10 and April 10, 2022. Results were compiled, analysed, and supplemented with a narrative discourse. Sixteen publications involving 903 diabetic individuals met the inclusion criteria, covering a range of renal health biomarkers.

**Results:** Our analysis revealed significant changes in renal markers such as serum creatinine, estimated glomerular filtration rate, blood urea nitrogen/urea, microalbuminuria, and uric acid across select studies. However, no notable alterations were observed in serum albumin, sodium, potassium, phosphorus, or total urine protein levels. Probiotics from *Lactobacillus* and *Bifidobacterium* families were extensively studied, along with *Streptococcus thermophilus*. Notably, *Lactobacillus plantarum* A7 in a single-species probiotic soymilk formulation showed favourable effects on multiple renal biomarkers in DKD patients without serious adverse events.

**Conclusion:** While probiotics, prebiotics, and synbiotics promise to mitigate renal health decline in diabetes via the gut–kidney axis, larger trials with focused objectives and advancements in nutraceutical formulations are needed to establish their role as adjunct

therapies. Further exploration of optimal formulations, understanding the gut–kidney axis, and elucidating mechanisms of action are crucial for future therapeutic development in this area.

## **P61- Influence of Microbiome-Modulating Therapies on Dyslipidemia Parameters in Metabolic Syndrome: A Systematic Review, Meta-analysis, and Meta-Regression**

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**Background:** Dyslipidemia, characterised by elevated triglycerides (T.G.) (>150 mg/dL) and reduced high-density lipoprotein (HDL) (<50 mg/dL), constitutes key components of metabolic syndrome (MetS) as defined by the International Diabetes Federation. Recent research portrays microbiome-modulating interventions such as probiotics, prebiotics, synbiotics, and faecal microbiota transplantation (FMT) to be promising adjunct therapies aimed at ameliorating the parameters of dyslipidemia in patients with MetS, but the consensus is limited.

**Methods:** In this study, we performed an extensive systematic review, including meta-analyses and meta-regressions, to evaluate the influence of microbiome therapies on biomarkers of lipidemia in MetS. We included clinical trials that are available and published until April 2023. Data analysis included random effects meta-analyses, depicting outcomes as mean differences (M.D.s) accompanied by 95% confidence intervals (C.I.s), alongside univariate linear model meta-regressions.

**Results:** This review included 19 clinical trial comparisons encompassing 797 MetS patients (407 intervention, 390 placebo/control). Our analysis revealed that these adjunct therapies did not significantly influence HDL levels (MD: 0.97 mg/dL, 95% CI: -0.10; 2.03,  $p=0.08$ ,  $I^2=58.5$ , 17 trial comparisons). However, statistically significant changes were observed in total cholesterol (MD: -8.97 mg/dL, 95% CI: -12.55; -5.38,  $p<0.01$ ,  $I^2=43.2$ , 19 trial comparisons), low-density lipoprotein (LDL) (MD: -5.05 mg/dL, 95% CI: -9.57; -0.53,  $p=0.03$ ,  $I^2=73.8$ , 19 trial comparisons), and T.G. levels (MD: -11.33 mg/dL, 95% CI: -19.25; -3.40,  $p<0.01$ ,  $I^2=55.9$ , 19 trial comparisons).

These results were often influenced by age, baseline BMI, initial biomarker levels, pro/synbiotic dosage, trial duration, type of nutraceutical, and geographic region.

**Conclusion:** These findings suggest a potential benefit of microbiome-modulating therapies in mitigating dyslipidemia-associated lipid abnormalities in MetS. However, the lack of significant impact on HDL highlights the complexity of lipid metabolism modulation through microbiome interventions. Further investigations, including well-designed clinical trials and meta-regression analyses, are warranted to elucidate the specific mechanisms underlying these effects and to explore sources of heterogeneity.

## **P62- Impact of Microbiome-Modulating Therapeutics on Glucose Homeostasis in Metabolic Syndrome: A Systematic Review, Meta-Analysis, and Meta-Regression of Clinical Trials**

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**Background:** Metabolic syndrome (MetS) is a multifaceted chronic disorder characterised by obesity, hypertension, and dysregulation of lipid and carbohydrate metabolism. Microbiome-modulating interventions such as probiotics, prebiotics, synbiotics, and faecal microbiota transplantation (FMT) have emerged as promising adjunct therapies in clinical trials to ameliorate parameters associated with glucose homeostasis and insulin levels.

**Methods:** We conducted a comprehensive systematic review, meta-analyses, and meta-regressions to assess the impact of these microbiome therapies on various biomarkers. We included clinical trials published up to April 2023. Data synthesis involved random effects meta-analyses, presenting results as mean differences (M.D.s) with corresponding 95% confidence intervals (C.I.s), along with univariate linear model meta-regressions.

**Results:** Pooling data from 21 trial comparisons across 19 studies involving 911 participants, we observed statistically significant alterations in fasting plasma glucose (MD: -4.03 mg/dL [95% CI: -6.93; -1.13];  $p$  effect=0.006,  $I^2$ =89.8%) and fasting insulin (MD: -2.56  $\mu$ U/mL [95% CI: -4.28; -0.84];  $p$  effect=0.004,  $I^2$ =87.9%) following microbiome-modulating therapy administration compared to placebo/control. However, no significant changes were noted in HOMA-IR, QUICKI, or HbA1c. Furthermore, our meta-regression analyses identified several influential factors, including age, baseline BMI, initial biomarker levels, dosage of pro/synbiotics, trial duration, type

of nutraceutical, and geographic region as determinants of treatment efficacy, underscoring the potential for personalised precision medicine approaches in managing glucose dysregulation in MetS patients. Nonetheless, heterogeneity poses challenges to the unequivocal clinical implementation of these interventions.

**Conclusion:** Supplementation with probiotics, prebiotics, synbiotics, or FMT demonstrated improvements in fasting glucose and insulin levels among individuals with MetS. Nevertheless, further large-scale, rigorously conducted trials are warranted to ascertain the clinical utility of these interventions.

## **P63- A Systematic Review of Clinical Outcomes of Patients with Hyperprolactinemia due to Thyroid Disease**

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**Background:** Thyroid disease (T.D.) is a known aetiology of hyperprolactinemia (HPRL). However, evidence regarding the clinical outcomes and management of HPRL due to T.D. is lacking. This systematic review aimed to assess the clinical characteristics, treatment, and outcomes of adults (>18 years) with HPRL due to T.D.

**Methods:** We searched PUBMED, SCOPUS, and EMBASE to identify eligible articles published in English until December 15, 2022.

**Results:-** A total of 804 patients were included, of which (N = 681, 85.9%) were females. Menstrual irregularity was the most prominent symptom of HPRL (N=84; 74.3%), followed by infertility (N=42; 42.9%) and galactorrhea (N=33; 51.6%). Subclinical hypothyroidism (N=456; 57.1%) was the most reported T.D., followed by overt hypothyroidism (N=314; 39.3%). 23 (2.9%) patients had hyperthyroidism, and 5 (0.63%) had subclinical hyperthyroidism. The median serum prolactin level was 60 (37.6-91) ng/ml. Of 38 patients with pituitary imaging reported, 26 (68.4%) showed pituitary enlargement, and 13 (34.2%) showed a suprasellar extension. After thyroid hormone replacement, 13 (76.5%) had complete resolution of pituitary enlargement, 3 (17.6%) had improvement, and 1 (5.9%) had no improvement. After treatment of T.D., complete resolution of HPRL was reported in 38 (70.4%) patients and improvement in serum prolactin levels in 10 (18.5%) patients. 6 (11.1%) patients did not have improvement/resolution of HPRL.

Dopamine agonists to manage HPRL were used only in 2 (3.2%) patients. A positive correlation was observed between higher serum TSH levels and higher serum prolactin levels ( $p= 0.03$ ). Patients with pituitary enlargement on imaging had a higher TSH level than those without. ( $p = 0.01$ ). No statistically significant differences in serum TSH levels were noted between patients with suprasellar extension on imaging compared to those without ( $p = 0.14$ ).

**Conclusion:** Overt and subclinical hypothyroidism can lead to HPRL and pituitary enlargement. Both HPRL and pituitary enlargement improve in most patients after treatment of T.D.

## **P64- Deciphering the Spectrum of IGF-2-Mediated Hypoglycemia in Non-Islet Cell Tumors: A Systematic Review**

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**Background:** Insulin-like growth factor-2-mediated hypoglycemia (IGF-2-MH) is a rare paraneoplastic syndrome linked with non-islet cell tumours. It is marked by substantial morbidity and mortality. Data is lacking on the epidemiology, clinical progression, and patient outcomes.

**Methods:** We conducted a systematic review of English language articles from PubMed, Scopus, and Embase reporting patient data on IGF-2-induced hypoglycemia.

**Results:** We analyzed 172 publications, comprising 1 randomised controlled trial, 1 prospective and 5 retrospective observational studies, 150 case reports, 11 case series, and 4 conference abstracts, examining a cohort of 233 individuals. The average age was  $60.6 \pm 17.1$  years, with an even distribution between males and females. Fibrous tumours were most frequently linked to IGF-2-MH (N=124, 53.2%), followed by liver-origin non-fibrous tumours (21, 9%), hemangiopericytomas (20, 8.5%), and mesotheliomas (11, 4.7%). Non-islet cell tumour hypoglycemia (NICTH) initially presented as hypoglycemia in 42% of instances. The most common symptoms were unconsciousness (26.7%) and confusion (21%). The mean IGF-2 and IGF-1 levels were  $882.3 \pm 630.6$  ng/dL and  $41.8 \pm 47.8$  ng/dL, respectively, with these levels not significantly impacting outcomes. Surgical intervention was the primary intervention (47.2%), succeeded by pharmacological treatments. The rate of recovery was 77%, with a significant adverse outcome correlation to chronic liver disease (CLD) (OR: 7.23, P: 0.03). A significant

association was found between recovery and fibrous tissue-originating tumours ( $p < .001$ ), and in logistic regression analyses, CLD was consistently a significant indicator of adverse outcomes.

**Conclusion:** This study shows that the majority of the IGF-2-MH is secondary to fibrous tumours. NICTH demonstrates a variable prognosis, which is fair if it originates from fibrous tissue. Management such as octreotide, corticosteroids, diazoxide, embolisation, radiotherapy, and surgical resection have variable success rates.

## **P65-Impact of Pharmacist Interventions on Therapeutic Inertia in People with Diabetes in Primary Care Setting: A Systematic Review**

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**Background:** Therapeutic inertia in diabetes, or the lack of timely adjustment to therapy when treatment goals are not met, is a growing concern in diabetes management globally despite well-established prevention and management strategies. As pharmacists' roles continue to expand in primary care settings, clinical interventions involving pharmacists that aim to address and overcome therapeutic inertia are on the rise. However, the literature regarding the impact of pharmacist interventions on therapeutic inertia management in primary care settings is conflicting.

**Objectives:** to systematically review and assess the impact of pharmacist interventions on improving glycemic control and reducing therapeutic inertia.

**Method:** A systematic search was performed using Medline, Embase, and Web of Science, supplemented by Google Scholar and reference lists, to identify comparative studies evaluating the impact of pharmacists' interventions on diabetes therapeutic inertia and glycemic control in primary care settings. The risk of bias was assessed using the Risk of Bias 2 and the Risk of Bias in Non-randomised Studies of Intervention tools. Furthermore, the interventions were appraised using the Descriptive Elements of Pharmacist Intervention Characterization Tool. **Results:** Twenty-two studies were included in this review ( $N = 29,593$ ). These include four randomised trials, 5 quasi-experiments, and 13 cohort studies. Most studies involved medication counselling (77.3%). They recommended changes to the therapeutic plan (72.3%) in scheduled, one-on-one, in-person appointments with monthly follow-ups compared to the usual care by primary care physicians only. The intervention arm had less therapeutic inertia, achieving their HbA1c target 13% more and 4.5 months earlier than usual care. The mean HbA1c reduction

in the intervention group was -1.5% (-0.63 to -2.8%) compared with that in the usual care (-0.5%[-0.05 to-1.4]).

**Conclusion:** This review further proves the importance of pharmacist interventions, as the results consistently favour pharmacist interventions across studies, regardless of the design or duration.

## **P66- A young patient with Graves' disease presenting with a triad of heart failure, pancytopenia and cholestatic jaundice: A Case Report**

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**Background:-** Graves' disease causes a large spectrum of clinical manifestations. Symptoms are primarily related to high circulatory thyroid hormone levels. However, it is also uniquely associated with several disorders that are not directly attributed to thyroid hormone excesses, such as Graves' disease, ophthalmopathy and dermopathy. Systemic complications of hyperthyroidism, such as heart failure, cholestatic jaundice and pancytopenia, are rarely reported at presentation.

**Case summary:-** We describe a case of a young man who presented with progressive cough, increased abdominal girth and ankle swelling for a few months. On examination, he had jaundice, bilateral exophthalmos, diffuse goitre, ascites, and significant lower limb oedema. Laboratory investigations showed increased Thyroxin level (free T4>100 pmol/L, free T3 20.6) with a suppressed thyroid stimulating hormone (TSH <0.01 micro-IU/L) and positive anti-thyrotropin receptor antibodies (TRAb 25.1 IU/L). In addition, blood investigations were remarkable for pancytopenia (Hb 5.7 g/dL, WBC 3.3\*10<sup>3</sup>/μL, ANC 1.3 \*10<sup>3</sup>/μL, and platelet count of 84 \*10<sup>3</sup>/μL), coagulopathy (PT 20.6 seconds, PTT 41 seconds, and INR of 2.0) and cholestatic liver enzymes elevation (ALT 57 U/L, AST 99 U/L, Alkaline phosphatase 200 U/L, R-value of 0.9). Magnetic resonant imaging of the liver showed congestive hepatomegaly with a mottled appearance of the liver and dilated inferior vena cava and hepatic veins. Echocardiography demonstrated mildly reduced left ventricular function (LVEF=43%) with grade 3 left ventricular diastolic dysfunction. The electrocardiogram showed sinus tachycardia without any evidence of atrial fibrillation. The patient was started on Carbimazole 20mg twice daily, furosemide 40mg once daily and Propranolol 10mg twice daily. Despite the concerns about using antithyroid medications in patients with impaired liver function tests and pancytopenia, the patient improved dramatically without worsening his haematological or biochemical parameters. Repeated laboratory investigations at day 21 post-therapy showed normalization of the liver enzyme levels,

coagulation profile, and trilineage hematopoiesis. Delayed diagnosis and management of Graves' disease can lead to severe sequelae in young people. Early initiation of antithyroid medications and beta blockers is essential for patients who are newly diagnosed with hyperthyroidism.

## **P67- Inadvertent Intravenous Administration of Insulin Glargine in a Patient with Type 1 Diabetes Mellitus: A Case Report and Literature Review.**

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### Case Report:

A 26-year-old woman with type 1 DM, managed with continuous subcutaneous insulin infusion (CSII) therapy, presented with epigastric pain, fatigue, and vomiting, indicative of hypoglycemia (blood glucose: 49 mg/dL). Despite initial management, hypoglycemia persisted, prompting discontinuation of the malfunctioning insulin pump. Intravenous dextrose was administered to counter hypoglycemia, followed by initiating intravenous dextrose 5% for maintenance. Concerns regarding diabetic ketoacidosis (DKA) post-pump discontinuation led to the inadvertent intravenous administration of 10 units of glargine instead of subcutaneously. Fortunately, the patient remained stable without significant hypoglycemia or allergic reactions. After receiving an additional dextrose of 5%, her blood sugar levels normalized over 24 hours with modified insulin correction and frequent monitoring. Despite an offer for an adjusted insulin regimen, the patient chose to continue CSII therapy. Upon discharge, vital signs were stable, and blood sugar levels were within the normal range (107 mg/dL), with a follow-up scheduled at the insulin pump clinic.

**Discussion:** This case differs from previous reports due to the absence of severe hypoglycemia, potentially influenced by the patient's younger age, prior CSII therapy, lower glargine dose, and ongoing dextrose administration. The short interval between pump discontinuation and glargine administration complicates attributing hypoglycemia solely to glargine. Additionally, distinguishing intentional versus accidental injection impacts management and prognosis, with intentional cases often presenting challenges in home settings and accidental cases typically involving lower doses and earlier detection of hypoglycemia.

**Conclusion:** This case report highlights the importance of safe insulin administration practices and the risks of inadvertent intravenous insulin glargine in type 1 diabetes. Vigilant monitoring and management prevented severe hypoglycemia. It underscores the need for healthcare

providers to adhere to proper protocols and educate patients to recognize hypoglycemia signs for optimal outcomes.

## **P68- Bardet-Biedl syndrome: a rare case of syndromic obesity and the role of Setmelanotide**

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Bardet-Biedl syndrome (BBS) is a rare, clinically and genetically heterogeneous, autosomal recessive condition. It is characterized by retinal dystrophy, polydactyly, central obesity, mental retardation, hypogonadism, and renal dysfunction. Commonly associated secondary features of BBS include liver fibrosis, type 2 diabetes mellitus, short stature, speech problems, and neurodevelopmental delay.

We report the case of a 27-year-old lady with severe obesity since childhood (currently obesity class 3 with BMI of 73 kg/m<sup>2</sup>), insulin resistance, visual impairment, retinitis pigmentosa and pseudotumor cerebri. Molecular studies revealed a mutation in the BBS9 gene. She was diagnosed with Bardet-Biedl syndrome in 2016 and is following up with multiple specialities, including genetics, neurology, and neuro-ophthalmology.

Her peak lifetime weight was 210 kg. She underwent sleeve gastrectomy in 2013, resulting in a weight loss of only 10 kg and subsequent gradual weight regain to her current weight of 193 kg. Standard approaches to obesity, including medical treatment with GLP-1 analogues and bariatric surgery, have not been formally investigated in BBS. The hyperphagia and resulting obesity in BBS patients involve the dysregulation of the hypothalamic leptin-melanocortin signalling pathway. Treatment with Setmelanotide, a melanocortin-4 receptor agonist, resulted in significant weight and hunger reductions in patients with BBS and has been FDA-approved for the treatment of obesity associated with BBS.

## **P69- A rare case of Galactoceles in a patient with macroprolactinoma. The hypothetical role of poor compliance with dopamine agonist therapy**

***Tarik Elhadd and El Abbas Ali***

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**Case Summary:** A 34-year-old man with type 2 diabetes mellitus (DM) presented with intermittent erectile dysfunction, dry ejaculation, despite sexual arousal. In addition, the patient reported an increase in the size of his breasts. On examination, bilateral stage V gynecomastia

and marked galactorrhea were noted. Laboratory tests revealed hyperprolactinemia and an MRI confirmed the presence of a 2 cm pituitary macroadenoma .The patient was treated with cabergoline, and the erectile dysfunction improved .Nevertheless, he discontinued the treatment for a while. At follow-up, he complained of a significant swelling in the right breast, 4 cm in size and firm in consistency. He was initially diagnosed with breast cancer based on ultrasound findings. The mass was successfully suctioned under ultrasound guidance, and obtained milk fluid.

**Discussion:** Hyperprolactinemia can arise due to a variety of causes, including prolactin-secreting pituitary adenomas (prolactinomas), other pituitary tumours, hypothalamic dysfunction, certain medications, chronic kidney disease, and hypothyroidism. Depending on the underlying cause and the extent of hormone elevation, it may present with diverse clinical manifestations. Hyperprolactinemia has diverse effects on various organs and systems, including an association with gynecomastia. It can impact male sexual function, causing symptoms such as erectile dysfunction and an inability to achieve an erection despite sexual arousal. In hyperprolactinemia, the mammary glands are stimulated to produce milk which can lead to accumulation in the mammary gland ducts and the formation of a cystic mass called a galactocele. Prompt diagnosis and appropriate management of hyperprolactinemia can help resolve symptoms and prevent further complications, including the development of galactocele. To date, 30 cases of galactocele of the male breast are reported in medical literature, though all are from the pediatric population, with only one case report in adult males.

**Conclusion:** This case highlights the importance of considering hyperprolactinemia as an underlying cause of erectile dysfunction and gynecomastia in male patients, especially those with type 2 diabetes mellitus. Furthermore, the development of a galactocele should be recognized as a potential complication of hyperprolactinemia. Early diagnosis and appropriate management, such as cabergoline treatment, can lead to an improvement in symptoms and a successful resolution of related complications.

## **P70- Once In A Lifetime: An Intracranial Germinoma Masquerading as a Pituitary Tumor with Secondary Lymphocytic Hypophysitis and Panhypopituitarism-A Case Report.**

**Tarik Elhadd<sup>1</sup>, Adeel Ahmed Khan<sup>1</sup>, El Abbas Ali Abdelmahmoud<sup>1</sup>, Ali Ayyad<sup>2</sup>, Rasha Ibrahim Amin<sup>3</sup>, Hayel Amin Ali Salih<sup>2</sup>, Amro Alhajali<sup>2</sup>**

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**Background:** Germinoma affecting the pituitary gland is extremely rare, as it generally involves the pineal gland when it arises intracranially. It may extend into the pituitary gland, which is known as a bifocal tumour. Sellar and suprasellar germinomas are rare encounters in endocrine clinics. However, they may arise primarily in the suprasellar region and extend into the pituitary. There is a high possibility that our case belongs to this category.

**Case Report:** A 16-year-old Egyptian girl presented in January 2023 with severe persistent headache, polyuria, polydipsia and delayed puberty. Investigations revealed central diabetes insipidus (CDI), low IGF-1, secondary hypogonadism, secondary hypothyroidism, and hyperprolactinemia (prolactin levels of 1400 mIU/L). MRI showed an intrasellar mass with heterogeneous features with suprasellar extension (Figures 1 and 2). Differential diagnosis was either pituitary macroadenoma or craniopharyngioma. She was treated with cabergoline, desmopressin and levothyroxine. An MRI pituitary in June 2023 showed some cystic degeneration, and the size was noted to be 10 x 14 mm. In January 2024, she presented with nausea and vomiting and was found to have secondary adrenal insufficiency. She was treated with hydrocortisone. In February 2024, a repeat MRI scan showed a considerable increase in the size of the pituitary lesion to 22 X 12 X 35 mm. She was referred for surgery, which was done on February 21, 2024. Histology showed extensive lymphocytic infiltration and evidence of germinoma with a Ki-67 of 70%. She was referred for chemotherapy, followed by radiotherapy.

**Discussion and conclusion:** Likely, this tumour had risen primarily in the suprasellar region and extends into the pituitary, as it presents with CDI. The absence of pineal gland involvement delayed the diagnosis. The mode of presentation of our case suggests that the tumour has possibly risen primarily in the suprasellar region and then extended into the pituitary. Very few intracranial germinomas involve mainly the sellar and suprasellar structures of the pituitary gland. The age of the patients and the clinical presentation should alert the clinicians to clinch the diagnosis early as the chances of cure are high.

## **P71-Amelioration of hyperthyroidism unmasks hypersexuality in patients with Coexisting pituitary FSHOMA**

**Tarik Elhadd, El Abbas Ali; A Wajid Safi**

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A 42-year-old Syrian male presented with palpitation and was diagnosed with hyperthyroidism in November 2021, likely of an autoimmune nature, as he had positive TRAb and anti-TPO. He had completed Covid-19 vaccination in September 2021. He did not achieve remission with carbimazole till January 2023. He was seen in the endocrine clinic with erectile dysfunction and loss of libido and was found to have very high levels of gonadotrophins of 14 and 16 iu/l for LH

and FSH, respectively, with a level of testosterone of 45 nmol/l (NRR 10-30), confirmed on repeat testing. MRI pituitary showed a macroadenoma. He was referred to the pituitary clinic, where the integrity of the remaining pituitary function was confirmed. He was counselled regarding definitive therapy with radioactive iodine therapy as per poor compliance with carbimazole and persistent hyperthyroidism and erectile dysfunction. Treatment was given in May 2023, and by August 2023, his erectile dysfunction flipped to extreme hypersexuality and excess libido that generated havoc in his marital life. By then, he has achieved euthyroidism. The patient denied any aphrodisiac medicine intake and requested help with the problem. He was referred to the neurosurgeon for pituitary surgery.

**Discussion:** Functioning gonadotroph adenomas (FGAs) are pituitary tumours secreting biologically active gonadotropins. The published literature includes only small case series or individual case reports. Before the 1970s, several cases in the literature suggested the presence of gonadotroph cell adenoma. 1974, Woolf and Schenk first clearly showed an FSH-secreting pituitary tumour that was associated with increased plasma FSH and the presence of FSH in the tumour tissue. Up to 1984, only about 50 cases were reported. In recent years, because of increased awareness of the clinicopathological features of this tumour, it has been more commonly diagnosed and reported in the literature. Gonadotroph adenomas — Although gonadotroph adenomas are considered to be "nonfunctioning," most do produce intact gonadotropins or their subunits. However, these adenomas are typically poorly differentiated and inefficient producers/secretors and do not raise serum gonadotropin concentrations. Thus, they are usually clinically "silent" and cannot be distinguished from other clinically nonfunctioning adenomas until immunohistochemistry is performed after pituitary surgery. The cause of gonadotroph cell adenoma is mainly unknown, although occasional cases reported in the literature have been secondary to gonadal failure. The gonadal function of our patient, in terms of puberty development and fertility history, was normal, and there was no primary hypogonadism.

**Conclusion:** FGAs cause distinct manifestations, and based on the limited published literature, they are primarily macroadenomas. Their pathogenesis remains enigmatic. Systematic series on their optimal management are lacking, but the primary therapy remains surgical adenoma excision. Given the risk of recurrence, long-term clinical and imaging follow-up is needed, and radiotherapy may be required.

Large-scale studies, in conjunction with endocrinological, surgical, and radiological evaluation, will be needed before the prognostic implications of gonadotroph cell adenoma are understood.

## **P72- A thyrotropin-secreting macroadenoma (feedback TSHoma) due to severe primary hypothyroidism, with successful conception following restoration of euthyroidism.**

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**Background:-** Pituitary hyperplasia/adenoma, often overlooked, is a relatively common occurrence in cases of primary hypothyroidism. It arises from the absence of negative feedback on the pituitary and hypothalamus. Its presentation and imaging characteristics may resemble those of a pituitary tumour. Patients may exhibit symptoms of hypothyroidism, hyperprolactinemia, and, in severe cases, visual field defects due to compression of the optic chiasm by the enlarged pituitary gland. Recognizing this condition is vital because the primary course of treatment primarily involves thyroid hormone replacement rather than surgical intervention.

**Case Summary:-** A 22-year Qatari young lady was referred for primary hypothyroidism and hyperprolactinemia in October 2022, with a prolactin level of 2900 mIU/l and TSH >500 mIU/l, FT4 <3.2 pmol/l. At that time, she had mild clinical hypothyroidism with excessive tiredness and recent weight gain. She also had galactorrhea and menstrual irregularity—periods by a few weeks. MRI scan of the pituitary showed a large macroadenoma. Tests of the pituitary reserve were normal. Initially, she was treated with cabergoline in a dose of 0.25mg per week and levothyroxine 50mcg for two months, following which a presumptive diagnosis of feedback TSHoma (Thyrotrophs hyperplasia). By then, the patient's TSH had improved to 25.71 mIU/l and her Free T4 to 9 pmol/l. Additionally, her prolactin went down to 469. Cabergoline was discontinued, and her levothyroxine dose continued to be up-titrated. Amid this, the patient conceived suddenly, her TSH was monitored, and the dose of levothyroxine was up-titrated to reach a dose of 200mcg. She successfully delivered a full-term baby boy in November 2023. The patient had no issues with headaches or visual disturbance.

**Conclusion:** This case highlights the rare occurrence of feedback TSHoma due to severe hypothyroidism in a young woman with longstanding autoimmune hypothyroidism. It highlights the importance of prompt recognition and appropriate management of feedback TSHoma, which can restore fertility and result in successful pregnancy.

## **P73- Success of pasireotide in tumour volume reduction of an invasive nonfunctioning pituitary tumour. A new horizon for a real malady!**

**Tarik Elhadd, Shahd. I Ibrahim, Elabbass Abdelmhamuod, Edwina Antoun**

**Background:** Invasive nonfunctioning pituitary tumours are challenging to treat, as the recurrence rate and morbidity are very high. Somatostatin receptor ligand treatment was tried as a last resort in these tumours, but the results were not always appealing. Broad-spectrum Broad-spectrum SRL, like pasireotide, may prove to be an option.

**Case Summary:** A 62-year-old Sudanese female was diagnosed with a nonfunctioning pituitary tumour in 2006 after she presented with severe headache and visual field defect. She underwent three transsphenoidal surgeries, the first in 2007, followed by radiotherapy in 2008. The tumour regrows, necessitating a second and a third operation in 2017 and 2022, respectively. The patient was left with panhypopituitarism, and she also had multiple comorbidities. Even after the third operation, the tumour continues to grow, with poor quality of life and persistent headaches. The patient was offered to try pasireotide in an initial dose of 40mg/q-monthly, to be increased to 60mg/q-monthly after 6 months. MRI pituitary done in July 2023 before initiation of pasireotide showed a tumour size of 22.1 x 18.7 x 15.8 mm, and in January 2024, it showed a size of 22.1 x 18.1 x 15.4 mm. The patient's headache resolved, and she lost weight for the first time in many years.

**Conclusion:** Although the role of SRL in nfPitNET is not yet fully established, the expression of SSRs in these tumours has been reported, and octreotide has been shown to stabilize the size of postsurgical tumour remnants. Our case adds dimension to the preliminary report that pasireotide, which acts against multiple SSRs, may be helpful in resistant invasive nfPitNET.

## **P74- A Heart in Distress: A Case Report of Cardiac Tamponade as the Forefront of Hypothyroidism Fatima**

*Al-Hattab , Fateen Ata, Ezeddin M.A Alataresh, Ammara Bint I Bilal, Haval Surchi*

**Background:** Hypothyroidism is a multifaceted endocrine disorder that can affect multiple systems, including the heart. Hypothyroidism is known to cause pericardial effusion but rarely leads to cardiac tamponade. Little is known about optimal management strategies and clinical outcomes of patients presenting with tamponade as the initial manifestation of hypothyroidism.

**Case Presentation:** A 42-year-old male with no past medical history presented with progressive exertional dyspnea, lower-leg swelling, facial puffiness, constipation, and weight gain over a few weeks. He had low blood pressure (80/60 mmHg), normal heart rate with sinus rhythm, normal oxygen saturation and was afebrile. Apart from mildly raised creatinine (125 mmol/L), his basic lab results were normal, and no signs of infective pathology were found. A chest X-ray revealed

an increased cardiothoracic ratio, suggesting pericardial effusion. Initial echocardiography revealed a large circumferential pericardial effusion with features of impending tamponade (diastolic collapse of the right ventricle and systolic collapse of the right atrium). The left ventricular ejection fraction was 35%, with grade 1 diastolic dysfunction

Further laboratory tests showed a markedly elevated thyroid-stimulating hormone (TSH) level of more than 100 mIU/L (normal range: 0.3–4.2), low T4 at 0.5 pmol/L (normal range: 11–23.3), and elevated antithyroid peroxidase antibodies (anti-TPO) at 239 IU/mL, indicating severe hypothyroidism. Following the initiation of thyroid hormone replacement therapy with levothyroxine (starting at 25mcg and later increased to 50mcg), the patient demonstrated significant clinical improvement. Serial echocardiograms showed regression of the pericardial effusion, stabilizing his condition without the need for invasive pericardiocentesis.

**Conclusion:** This report highlights the association between hypothyroidism and cardiac tamponade, emphasizing prompt diagnosis and thyroxine replacement to improve outcomes and reduce invasive interventions, stressing the value of a multidisciplinary diagnostic strategy.

## **P75- The conundrum of double unilateral adrenal adenomas in a case of primary hyperaldosteronism. The value of adrenal venous sampling.**

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**Background:** Two-thirds of all cases of primary aldosteronism are caused by bilateral idiopathic hyperplasia, and only one-third are caused by an adenoma that produces aldosterone. CT scan of the adrenal is typically used to evaluate the adrenal glands. If surgery is considered, adrenal vein sampling is the most accurate method for distinguishing between unilateral and bilateral adrenal aldosterone production.

**Case report:** a 52-year-old lady was diagnosed with possible essential hypertension in 2016. She had a relatively resistant course, requiring three medications to control her BP. She had tests for secondary hypertension by the internist who saw her initially in 2016, but no tests for hyperaldosteronism were done. She was seen early in 2023 for palpitation by the cardiology team, who felt her BP control was not yet optimal. Thiazide diuretic indapamide was added to her other antihypertensive agents, which resulted in a significant drop in potassium levels. That dropped the penny when revisiting the issue of secondary HTN. The workup showed no pheochromocytoma or hypercortisolism but indicated an aldosterone level of 283pmol/L, Renin of 0.26 ng/ml/hr and a ratio of 39. A CT scan of the abdomen revealed two left adrenal lesions, measuring 14 and 15 mm in maximum diameter, which were consistent with adrenal adenomas. She was started on spironolactone in solo, and other antihypertensive were stopped. That

resulted in significant improvement in her BP control. The patient went to the Mayo Clinic for an expert second opinion. She was assessed there and had an adrenal venous sampling, which confirmed that the source of high aldosterone was coming from both adrenals. The decision was made there only to continue medical therapy with spironolactone 50mg/day.

**Conclusion:** This is a sporadic case of multiple unilateral adrenal adenomas concomitant with adrenal hyperplasia in a case of primary hyperaldosteronism. Only a handful of cases have been reported in the literature so far. A Subset of patients with bilateral adrenal hyperplasia may have a propensity to develop nodules. The true nature of the multiple adrenal adenomas in such a context may cause diagnostic difficulty. Here, adrenal venous sampling comes to the fore as the gold standard means to resolve such a conundrum.

## **P76- Exploring the Link between Thymectomy and Type 1 Diabetes: A Pioneering Case Report**

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**Background:** The thymus plays a critical role in immune regulation, especially in the early years of life. Thymectomy is considered the cornerstone of benign or malignant thymomas. However, patients are reported to develop autoimmune dysregulation after thymectomy, including systemic lupus erythematosus, Sjogren syndrome, Rheumatoid Arthritis, Hashimoto Thyroiditis, Systemic vasculitis, and Pemphigus Vulgaris. While animal studies have suggested a correlation between thymectomy and T1D, clinical evidence is lacking in humans.

**Case Presentation:** A 25-year-old female who had malignant thymoma underwent chemotherapy, followed by thymectomy and radiotherapy, and was admitted with hyperglycemia. She had no family history of autoimmune diabetes mellitus (AID) or any other autoimmune disorders. She developed AID around one-year post-thymectomy, evident from raised glycosylated haemoglobin (which was normal pre-thymectomy), positive anti-glutamic acid decarboxylase (GAD) antibodies (>2000 IU/mL), low C-peptide (0.58 ng/mL), ineffectiveness to oral glucose-lowering agents, and positive response to insulin. The patient was managed with basal and pre-meal insulin and has remained stable on follow-ups without any worsening of her AID.

**Discussion:** This case underscores the potential for thymectomy, particularly following thymoma, to precipitate autoimmune diabetes in humans, keeping in line with prior animal research findings. It highlights the importance of proactive post-operative monitoring for autoimmune conditions in patients undergoing thymectomy. The mechanisms through which thymectomy may induce T1D involve complex interactions between genetic predisposition and altered immune regulation, necessitating further investigation.

**Conclusion:** This report presents the first case of T1D onset following thymectomy to our knowledge, suggesting a potential link between thymectomy and the development of autoimmune diabetes. This case adds to the preliminary data available on thymectomy as a risk factor for T1D and emphasizes the need for awareness and monitoring for autoimmune flare following thymectomy.

## **P77- The relationship between environmental PM2.5 exposure and childhood obesity: A Scoping Review**

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**Background:** The association between fine Particulate Matter (PM2.5) exposure and childhood obesity is an emerging area of research, and many studies are being conducted to establish causality. The presence of an association has implications for addressing air quality policies to reduce the childhood obesity pandemic.

**Objectives:** This scoping review aims to examine the nature and extent of current research on the relationship between environmental PM2.5 exposure and childhood obesity globally.

**Methods:** The Preferred Reporting for Systematic Reviews and Meta-Analyses extension for Scoping Reviews checklist guided the review. Search keywords were developed based on the Population, Concept, and Context framework. A literature search was conducted on the databases Scopus, Brunel University library, and PubMed. Eligibility criteria included articles from the global literature published from 2013 onwards. The literature data items were extracted and charted. A Thematic Content Analysis was performed on the charted literature.

**Results:** Thirteen studies were retrieved as potential evidence for this review. Thematic Content Analysis identified six key themes: (1) Impact of PM2.5 on childhood obesity, (2) Susceptible groups, (3) Types of PM2.5 exposures, (4) Geographical variations, (5) Maternal exposure, (6) methodological approaches. Twelve out of the 13 articles selected reported a positive association between PM2.5 exposure and childhood obesity. It has been suggested that older children and those living in deprived areas are more likely to display a positive correlation

between PM2.5 exposure and obesity. Studies conducted in China tended to report stronger associations than those conducted elsewhere, while the role of prenatal exposure was only demonstrated in some articles. Ten out of 13 studies selected reported inadequate control of confounders as a study limitation.

**Conclusion:** This review systematically mapped the evidence available on the association between PM2.5 exposure and childhood obesity. Future research should focus on gaining a deeper understanding of PM2.5 biological mechanisms and controlling for confounders, as well as investigating whether the observed impacts are sustained over the life course. Additionally, ascertainment of exposure needs to be meticulously investigated rather than estimated to ensure valid causal inference.

## **P78- Enhancing Diagnostic Accuracy in Hypoglycemia Evaluation through a Quality Improvement Project on 72-Hour Supervised Fasting Test**

**Fateen Ata, Adeel Ahmad Khan, Elabbass Abdelmahuod, Mohammed Abdallah Zaki Aloqaily, Mohammad Zeyad Mohammad Nofal, Zainab Dabous, Dabia Al Mohannadi**

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**Background:** The 72-hour supervised fasting test (72-HSFT) is pivotal in investigating hypoglycemia. However, inaccuracies in test execution and interpretation often lead to diagnostic ambiguities and unnecessary healthcare expenditures.

**Goal Statement:** To reduce the percentage of unnecessary/incorrect biochemical tests during the 72-HSFT for hypoglycemia from 62.5% to 25% within 24 months.

**Methods:** Following baseline data collection, we will educate medical teams, nurses, and laboratory staff on accurate 72-HSFT. The interventions will include the introduction of an auto-text protocol in Cerner®, standardization of lab testing via an order set for 72-HSFT, and interactive educational sessions. The project will be conducted in the medicine inpatient wards.

**Results:** For baseline data collection, 33 patients were evaluated for hypoglycemia at Hamad General Hospital, with nine undergoing a 72-HSFT from June 2022 to June 2023. These patients had a mean age of 34.5 years, and 66.6% were females. The majority were Qataris (55.5%), with Egyptians, Sudanese, Saudis, and Filipinos each making up 11.1%. Diagnoses ranged from drug-induced hypoglycemia to insulinoma, with the majority (66.6%) experiencing issues during the 72-HSFT, such as inappropriate timing for lab submissions and breaking fast too early. Only 33.3% completed the test correctly. The errors encountered in the accurate 72-HSFT are tabulated (Table 1). Additionally, the frequency of ordering specific tests was inconsistent across

the group, with the C-peptide test being ordered 36 times (averaging four times per person) and both the Insulin Level and BHB (Beta-Hydroxybutyrate) tests being ordered 35 times (3.8 times per person).

**Conclusion:** The initial data underscore significant challenges in conducting accurate 72-hour supervised fasting tests (72-HSFT). They highlight that targeted interventions can potentially improve the accuracy of the 72-HSFT, reducing unnecessary biochemical testing and associated costs. Ongoing efforts to refine the intervention and educate staff are expected to enhance outcomes, significantly contributing to optimal resource utilization and improved patient care in hypoglycemia evaluation.

## **P79- Facebook advertisements as a recruiting tool for healthy participants for research studies in Qatar**

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**Background:-** Social media is increasingly becoming a popular platform worldwide. It has proven to be an effective tool in recruiting research participants by targeting specific audiences according to each study's criteria after obtaining IRB approval for using social media as part of the recruitment process. In this paper, we assess the use of Facebook advertisements as a recruiting tool for healthy participants for the "Footprints of Insulin Sensitivity in Women from Arabic Ethnicity" study.

**Method:** The inclusion and exclusion criteria were included in a poster that was approved by the IRB and intended for social media use (Fig. 1). The research team has posted the poster multiple times on various Facebook groups, targeting healthy female volunteers who meet the necessary criteria.

**Results:** Throughout a two-year recruitment process, we have posted our research posters six times on various Facebook groups. So far, we have received 366 responses, which we have screened through phone screenings. Out of these, 174 individuals were excluded before or after clinic screening for various reasons. The most common reasons for exclusion were a high BMI (>28), being too busy to comply with the research visits, using contraceptives, and having low levels of vitamin D, as shown in Table 1.

**Conclusion:** Using Facebook ads to recruit healthy volunteers for clinical research in Qatar is effective due to its broad reach. However, a limitation is that unknown medical problems cause high exclusion rates.

## **P80- Diabetes Registry Data Analysis at the national diabetes centre, Hamad general hospital**

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**Background:** The Diabetes Registry collects various patient information to produce analytical reports that assess the level of care and identify areas for improvement. They also give insight into the results and compare them with the desired outcome.

**Objectives:** This report analyzes the Data from the Diabetes Registry for 13379 diabetic patients followed by the National Diabetes Center (NDC) at Hamad General Hospital.

**Methods:** These patients were selected randomly from the lists of clinics in NDC Hamad General Hospital. In addition to having an established diagnosis of diabetes mellitus, all patients should have at least three HbA1C readings and a minimum of two LDL readings. Vital signs and biometric measurements like weight, height, and BMI should be available for all patients.

**Results:** We are presenting a diabetes registry of 13379 patients. According to nationality, Qataris are 7025 patients. The percentage is 52.5%. There were 6354 non-Qatari patients, for a percentage of 47.5%. Females were slightly more than males, 51.8%: 48.2%. Most patients had type 2 DM, 92.4%, while type 1 DM constituted 5.5%. Current smokers were around 11.4%, while Ex-smokers were 8.5%. Only 33.5% are involved in regular exercise. Obesity and overweight are highly prevalent in the selected patients, 56.4% and 30%, respectively. Nephropathy has the highest percentage of microvascular complications, 32.8%, while 17.2% have retinopathy, 13% have neuropathy, and only 1.8% have diabetic foot disease. Cardiac disease is present in 19.1%. Hba1c  $\leq$  7% was achieved in 35.8%, while 24.4% had HbA1C  $>$ 9%. 22.9% have HbA1C 7.1-8%. LDL  $<$  2.6 mmol/L was achieved in 63.3% of the patients. Insulin was used as the sole therapy in 9.1%, Oral Medications alone were used in 45.4%, Insulin added to oral medications was used in 27.6%, and GLP1 agonists were added to Insulin in 0.8% while added to oral medications in 8.8%. Insulin, GLP1 agonists, and oral medications were used in 8% of the cases.

**Conclusion:** The diabetes registry gives insight into the quality of care and the level of diabetes control. It also compares the diabetes outcome to the global standards to help plan national policies and effectively utilize health resources.

## **P81- Cross-sectional Audit for people with Type 1 Diabetes Mellitus on Dialysis at Fahad Bin Jasim**

**Abeer Abdalrubb, Ayda Hassan, Noora Al Thani, Hakim Idris, Mohammed Osman, Mohammed Bashir**

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**Background:** People with Diabetes mellitus type 1 (DM1) undergoing dialysis face unique challenges affecting glucose levels and medication pharmacokinetics. Achieving glycemic targets amidst fluctuating insulin needs and dietary restrictions is crucial. Besides, those patients are at higher risk of cardiovascular disease (CVD), peripheral vascular disease, peripheral neuropathy, and progression of retinopathy. Hence, regular complications screening and patient education are essential for optimal management. Comprehensive care management involving nephrologists, endocrinologists, and dietitians aims to improve outcomes, reduce morbidity, and enhance the quality of life for DM1 patients on dialysis.

**Aim:** This audit investigates the demographics, health parameters, and care received by people with (DM1) undergoing dialysis.

**Method:** Data were collected from all people with DM-1 attending FBJ for dialysis between January and December 2023.

**Results:** - We included 18 patient; 9(50%) were males, majority were Qatari 11(61.1%); mean age of 40.7±8.7 years.; mean BMI 29.7± 7.5kg/m<sup>2</sup>, mean duration of DM was 26.2± 8 years, mean duration of dialysis was 5.6 ± 3.7 years, mean HBA1c 7.8 ± 1.3 %, 18 (100%) had retinopathy and 3(16.7%) had CVD. Over 12 months, 2.54% received diabetes dietitian consultation, 11.11% had diabetes educator consultations, 66.7% were seen by podiatry, and 44.4% had retina screening. Furthermore, only 3(16.7%) used continuous glucose monitoring (CGM).

**Conclusion:** In summary, DM1 patients on dialysis exhibit diverse demographics and health profiles, with varying levels of engagement with care services, highlighting the need for tailored and comprehensive management approaches.

## **P82- Cross-sectional Audit for people with Type 2 Diabetes Mellitus on Dialysis at Fahad Bin Jasim**

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**Background:** Patients with type 2 diabetes mellitus (DM2) undergoing dialysis face complex health challenges. Patients with DM2 on dialysis commonly experience multiple other comorbidities: cardiovascular disease (CVD), peripheral vascular disease, peripheral neuropathy, and retinopathy. Achieving optimal glycaemia control is challenging due to the limited oral medication options, fluctuating insulin doses and altered medication effects. Regular screening for diabetic complications like retinopathy and neuropathy is crucial.

Practical, comprehensive care management tailored to these needs is vital for improving outcomes in DM2 patients on dialysis.

**Objectives:** This Audit investigates the demographics, health parameters, and care received by patients with type 2 diabetes mellitus (DM2) undergoing dialysis.

**Method:** Data were collected from all people with DM-2 attending FBJ for dialysis from January to December 2023.

**Results:** We included 197 participants; the majority were males 119 (60.4%), Qatari 123 (64.4%), mean age  $63.3 \pm 11$  years, mean DM duration  $23.0 \pm 9.1$  years, mean duration of dialysis  $5.3 \pm 4.4$  years, mean BMI  $30.3 \pm 7.2$  kg/m<sup>2</sup>, and mean HBA1c  $7.3 \pm 1.4\%$ . Furthermore, 76(44.2%) were obese, 194 (98. %) had retinopathy, and 124 (62.9%) had CVD. Most patients were treated with Insulin 144 (64.4%), Linagliptin 110 (56.2%), Repaglinide 21 (10.7%), and 6 (2.7%) were on GLP-1 RA. Foot assessment was done in 197 (88.7%), retina screening in 84(42.6%), 12 (6.1%) were seen by diabetes educators, and 5 (2.5%) were seen by diabetes dietitians. Continuous glucose monitoring (CGM) was used by 35 (17.7%), 19 (9.6%) did not use any glucose monitoring method.

**Conclusion:** We identified a few gaps in caring for people with DM-2 undergoing dialysis. A tailored care strategy for optimizing outcomes in DM2 patients undergoing dialysis is critical.

### **P83 - Improving pneumococcal and influenza vaccination rate among patients with diabetes mellitus attending Al Khor hospital**

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**Problem statement:** The prevalence of diabetes mellitus in Qatar is considerably higher than the global rate. Patients with diabetes are at higher risk for severe yet preventable respiratory infections. Despite the evidence supporting prophylactic vaccinations and the availability of these vaccines in Hamad Medical Corporation, most diabetic patients attending the outpatient department in Al Khor Hospital are not vaccinated, which consequently leads to the high rate of diabetic patients' hospitalization due to respiratory tract infections, especially in the winter season.

**Objectives:-** To improve the rate of prophylactic vaccination rates in diabetic patients from 30th Oct 2022 to 1st Nov 2023 by 30% from baseline

**Interventions:** Increase physicians' awareness about the importance of prophylactic vaccination in diabetic patients; enhance the role of nurses and diabetic educators in identifying and counselling diabetic patients who need the vaccines; create computer stickers/triage notes for Patient education campaigns; and prepare written educational material.

**Results:** We achieved the aim of increasing the rate of influenza, pneumococcal-13, and pneumococcal-23 vaccine uptake by people with diabetes attending Al Khor hospital by 127%, 280%, and 48% from baseline, as explained in Figure 1 below.

**Conclusion:** Although we achieved our aim through multiple interventions, this rate is suboptimal compared to the best evidence-based practice. Multidisciplinary team members need to engage in multiple forms of intervention.

## **P84- Facilitating Patients Journey Through Collaboration: A Referral Pathway to Improve Timely & Continued Access to Medical Care between the Department of Medicine -HMC and PHCC**

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**Background:-** Hamad Medical Corporation (HMC) is the tertiary healthcare provider in Qatar, whereas primary care is provided by Primary Health Care Corporation (PHCC). Waiting time in HMC outpatient clinics is a significant concern as patients are referred from PHCC to receive specialized care. The exit pathway back to PHCC for medically stable patients is not structured and systematic. This leads to saturation in HMC clinics and delays average access to specialized care by 50-60 days.

**Objectives:** To facilitate patients' journey from PHCC to HMC for the continuity of care; To streamline patient flow and safety between both entities; To provide timely access to patients in need of specialized care at HMC

**Methods:** An HMC-PHCC joint task force was convened in June 2022 to streamline the exit pathway. Piloting was done through Department of Medicine (DoM) clinics, starting with the Ambulatory General Internal Medicine and Endocrinology division. The intervention involved building a new referral order in Cerner, standardizing discharge criteria and mapping the referral pathway to PHCC. Plan-Do-Study-Act was implemented, and data from the HMC Business Intelligence Unit was monitored for Key Performance Indicators to measure performance efficiency.

**Results:-**

Since 31st Jul 2022, 3256 patients from endocrinology, AGIM, and other medicine specialities have been referred to PHCC with confirmed appointments; AGIM and Endocrinology accounted for around 30% of total patients. HMC created an average of 180-190 new patient slots every week. PHCC ensured appropriateness and continuity of care through timely access and patient satisfaction

**Conclusion:** This project benefits the Qatari healthcare sector and has a massive impact on the cost-effectiveness of service delivery. Consequent phases will include all divisions of DoM, where medically stable patients will be safely transitioned to PHCC while creating slots for those who need specialized care at HMC. Overall, it allows for better management of services and resources across HMC-PHCC.

## **P85- Diabetes Care at Medical Outpatient Clinic: Are We Up to Standards?**

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**Background:** Diabetes is the leading cause of cardiovascular morbidity and mortality worldwide. Comprehensive and multidisciplinary diabetes mellitus care is associated with better patient outcomes. Physicians frequently encounter diabetic patients at Hamad General outpatient clinics. During the outpatient encounter, the physician attempts to cover many vital aspects of DM care, including medication compliance, lifestyle modification, early detection and treatment of complications, appropriate referrals, and vaccinations.

**Objectives:-** This audit aims to investigate whether the critical elements of DM care were addressed during routine clinic visits.

**Methods:** The study included all patients with DM who attended 2 of our outpatient clinics during a month. The study describes the compliance rate for DM care bundles of appropriate investigations, necessary referrals, vaccinations, and nurse compliance with BP measurement, weight, and BMI calculations.

### **Results:-**

Eighty-six diabetic patients visited the clinic during the selected period; 57% were males, the average age was 60, and the mean Hba1c value was 7.6%. Composite compliance was calculated for each of the sub-categories in the study. The results showed the highest compliance to ordering necessary investigations, with a percentage of 85.7%. Second was compliance to essential referrals, including retinal screening podiatry education and dietitian

referrals, which had a compliance of 63%. The lowest was compliance to important due vaccinations, with a composite value of only 21.5%.

At each clinic visit, nurse compliance with blood pressure measurement was 100%; however, height and weight measurements were 88%.

**Conclusion:**

While some aspects of DM care were well addressed, there is a clear gap, especially in referral to related vaccinations and patient-patient educators.

**P86- Pattern of Blood pressure control in treated hypertensive patients, Experience from Resident Medical outpatients, Hamad General Hospital, Qatar**

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**Background:** Hypertension is the leading cause of cardiovascular morbidity and mortality worldwide. In the literature, the prevalence of uncontrolled hypertension is reported to range between 45% and 81%. Epidemiological studies linked uncontrolled hypertension to increased rates of ischemic heart disease and stroke.

**Objectives:** The aim of this study is to describe the pattern of blood pressure control in a resident medical outpatient setting, including patients with a high cardiovascular risk profile and chronic kidney disease.

**Methods:** One hundred patients with established hypertension were randomly selected from medical outpatients. Demographic factors, Blood pressure records, and presence of chronic diseases were extracted from electronic medical records. Several antihypertensive medications, especially angiotensin blocker agents, were also included in the study.

**Results:** The mean age was  $54 \pm 11.5$  years; 40% were females, 19% had chronic kidney disease (CKD), and 58% had diabetes mellitus(DM). The mean systolic BP was  $135 \pm 17$  mmHg. The mean diastolic BP was  $77 \pm 11$  mmHg. Among people with CKD, 63% of patients had more than 130 mmHg systolic BP, while only three had more than 80 mmHg diastolic BP. Among people with DM, the mean Systolic BP was  $131 \pm 16$  mmHg, the mean diastolic BP was  $74 \pm 9$  mmHg, 32 patients ( 55%) had systolic BP of more than 130 mmHg, and 15 patients (25 %) had diastolic BP of more than 80 mmHg.

**Conclusion:** Overall, systolic and diastolic blood pressure seem reasonably controlled in our patient. However, in a subset of patients with diabetes and chronic kidney disease who are at higher cardiovascular risk, the systolic blood pressure is sub-optimally controlled.

## **P87- The management of pregnancies complicated by Diabetes: The journey from Antenatal, Intrapartum and postpartum care: A retrospective practice Audit review of service provision at a maternity unit in Qatar**

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**Background:-** The worldwide prevalence of hyperglycemia in pregnancy is rising with the increasing prevalence of diabetes globally. The prevalence of GDM in Qatar is high, reaching 30%. Diabetes in pregnancy is associated with maternal and fetal complications; therefore, appropriate diagnosis and strict management are recommended.

**Study design:** This Audit of practice was conducted at Sidra Medicine. Pregnant women with diabetes (n=267) were identified by documented diagnosis on retrospective chart review of electronic patient records of women who delivered at the hospital between 1st Jul 2022 and 31st Dec 2022 (N=738).

### **Audit standards:**

1. Documentation of pre-pregnancy or early-pregnancy maternal weight
2. Women at high risk of GDM should have an early oral glucose tolerance test (OGTT) at 16-18 weeks of pregnancy.
3. On diagnosis of GDM, women to be referred to the dietitian
4. Women with pregestational diabetes should have an Hba1c check, receive 5mg of Folic acid supplementation in the first trimester, receive Aspirin in pregnancy, have had retinal assessment during the current pregnancy and be referred to an Endocrinologist for review.
5. Pregnant women with diabetes receiving steroids as inpatients were admitted and monitored for strict glucose control in the hospital setting.
6. During active labour, two consecutive capillary glucose readings of  $\geq 7$ mmol trigger the starting Variable Rate Insulin Infusion (VRII).
7. Patients with GDM are to have an OGTT 6-12 weeks after delivery.

**Results:** There were 738 Deliveries during the study period. Overall, diabetes complicated 267 of them (36.2%). Of the diabetic group, 256 (34.7 %) had GDM, 7 (0.95%) had Type 2 Diabetes and 4 (0.14 %) had Type 1 Diabetes. Of the GDM patients, 194 (75.8%) were on diet control, 49 (19.1%)

were on Oral medications, and 9 (3.5%) were on insulin. First-trimester or pre-pregnancy weight documentation was found in 52.7% of the patients with diabetes. Of all the patients with GDM, 52.7% were referred to see a dietician. One hundred eighteen patients with diabetes were delivered by CS (118/267 = 44.2%), Compared to 160/461 CS deliveries in those without diabetes (33.2%). There were 164 patients with a BMI greater than 30; of these, only nine patients had early GTT (5%). Orders for postpartum GTT were found in 33.6% of the patients with GDM.

**Conclusion:** The audit identified gaps in the care pathway for pregnant women with diabetes. Barriers and challenges facing the implementation of practice changes should be addressed to improve the quality of care for women with high-risk pregnancies.