Free Communications of the Tenth Gulf Association of Endocrinology and Diabetes Annual Congress, Riyadh, Saudi Arabia, November 3–5, 2022

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These are the abstracts of the Tenth Clinical Congress of the Gulf Association of Endocrinology and Diabetes (GAED) held on November 3–5, 2022. The declared educational objectives of the congress were to give a "state of the art in endocrine practice." Plenary and symposia presentations were delivered online by international and regional key opinion leaders. In addition, free communications on current research and clinical practice in the region and worldwide were presented online. We present here the abstracts of the congress as submitted by the authors of the free communications after minimal restyling and editing to suit the publication requirements of the journal. We hope that by publishing them in our open-access journal, we provide early recognition of the work and extend the benefit to those who could not make it to the live presentations.

The present meeting is the Tenth Annual Congress of the GAED since its inception.[1] Its last year's clinical congress was converted to a virtual format.[2] The present congress was held on November 3–5, 2022. The congress aims to bring together the best gathering of endocrinologists in the Arabian Gulf.

The declared educational objectives of the congress are to give a "state of the art in endocrine practice." It caters primarily to the professional development needs of endocrinologists and internal medicine, with a particular interest in diabetes and endocrinology. However, in the past, many primary care physicians, doctors in training, and specialist nurses and educators found many aspects of the contents particularly relevant to their continuous professional development needs.

The conference highlights the latest in research and clinical practice in presentations delivered by international and regional key opinion leaders. Furthermore, free communications on current research and clinical practice in the region and worldwide attract significant interest. The GAED sees this as a core role in its mission to improve care through education and research since gaps in both attitudes and practices have been identified in our region. The abstracts of the free communications as submitted by the authors after minimal restyling and editing suit the publication requirements of the journal. We hope that by publishing them in our open-access journal, we provide early recognition of the work, stimulate networking between parties of mutual research interests, and extend the benefit to those who could not make it to the live presentations.

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ORAL COMMUNICATIONS

OC1. Associations of Dietary Calcium/Phosphorous with Biochemical Osteomalacia

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Background: Our previous study revealed a high prevalence of abnormal mineralization markers, namely low 25 hydroxyvitamin D (47.9%), high serum alkaline phosphatase (3.7%), and low calcium-phosphate product (9.8%) suggestive of biochemical signs of osteomalacia (OM, defined as any two of these risk factors). OM was more prevalent in girls (11.2%) than in boys (5.0%). In this follow-up study, we aimed to evaluate whether biochemical OM was associated with low intakes of calcium and phosphorous.

Methods: Saudi adolescents ($N = 2{,}938$, 57.8% girls) aged 12 to 17 years from 60 different secondary and preparatory year schools in Riyadh, Saudi Arabia, were included in this study. A dietary recall for daily intakes of nutrients/minerals using a validated computerized food database ESHA, the Food Processor Nutrition Analysis program, was collected. Compliance to reference daily intake (RDI) was calculated. Fasting blood samples were collected, and circulating levels of 25 hydroxyvitamin D, alkaline phosphatase, calcium, phosphate, and C-terminal telopeptide were analyzed.

Result: In total, 1,703 Saudi adolescents (991 girls and 712 boys) provided the dietary recall data. A significant proportion (89.6%, 92.2%) of the participants failed to achieve the RDI of 1,000 mg/d and 10 mcg/d of dietary calcium and vitamin D, respectively. The average daily dietary calcium intake was significantly lower in girls compared with boys (median levels of 294.3 and 345.5 mg/day, respectively, $p < 0.001$). In contrast, boys reported lower dietary intakes of phosphorous compared with girls ($p < 0.01$). Interestingly, no significant correlation in the status of biochemical OM or its risk factors with dietary calcium intake was found, irrespective of sex. However, circulating 25 hydroxyvitamin D and alkaline phosphatase levels correlated negatively with daily dietary intakes of phosphorous in girls ($r = -0.18, p < 0.001$) and boys ($r = -0.14, p < 0.05$), respectively.

Conclusion: This study suggests a need for vitamin D fortification and increased dietary calcium in the diet of Saudi adolescents. The results also show that all adolescents exceeded the RDI for dietary phosphorous. Still, none met the RDI for dietary calcium and vitamin D, and none had sufficient 25 hydroxyvitamin D levels (>50 nmol/L). The high phosphate diet may compensate for the insufficient supply of calcium and vitamin D. This insufficient supply would otherwise have caused a much higher prevalence of biochemical OM than the 6.2% we observed.

OC2. Primary Hyperparathyroidism in Saudi Arabia: A Multicenter Observational Study

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Background: Primary hyperparathyroidism (PHPT) is a common cause of hypercalcemia and remains understudied in Arabs. The present study, the largest within the Gulf Cooperation Council countries, aims to determine the demographics and clinical presentation of PHPT in Saudi Arabia.

Methods: In this multicenter retrospective study involving three tertiary hospitals in different geographic locations of Saudi Arabia, namely, Riyadh, Al Ahsa, and Jeddah, a total of 205 out of 243 confirmed PHPT cases, aged 16 to 93 years, old were included ($N = 96$ from Riyadh; $N = 59$ from Al Ahsa and $N = 50$ from Jeddah). Demographics, clinical manifestations, and surgical outcomes were recorded as well as laboratory and radiologic investigations, including serum parathyroid hormone (PTH), 25(OH)D, adjusted calcium, estimated glomerular filtration rate, and nuclear scan outcome.

Result: PHPT cases appeared to increase over time compared with other local studies published, with 12.8 cases per 100,000 hospital population. Females outnumbered males (3:1), with 86% seen as outpatients. The average age was 59.8 ± 15.5 years. An abnormal PTH scan was seen in 171 patients (83.4%). Kidney stones were the most common renal manifestation (32 cases, 15.6%), and osteoporosis was the most common skeletal manifestation (67 cases, 32.7%). Al Ahsa had the highest prevalence of multiple comorbidities at 54%. It had the highest prevalence of obesity as a single comorbidity (17%) in comparison with other regions ($p < 0.05$). Jeddah recorded the highest prevalence of osteoporosis with bone and joint pains (30%; $p < 0.05$).

Conclusion: A comparison of present data with previous local studies suggests an increasing trend in PHPT cases in Saudi Arabia. Regional variations in the clinical presentation of PHPT were observed and warrant further investigation.

OC3. Effect of Vitamin D Deficiency Treatment on Glycemic Control in Children and Adolescents

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Background: The positive effect of vitamin D supplementation on glycemic control has been shown in a limited number of studies with conflicting results yet to be convincing and conclusively proven.

Objectives: Our objective was to evaluate the effectiveness of vitamin D deficiency treatment on glycemic control in children and adolescents with T1DM.

Methods: This observational study was conducted in King Abdelaziz Medical City-Jeddah. A total of 67 out of 123 participants who were found to have vitamin D deficiency in the previous study and received vitamin D supplementation completed the study within 3 months. The remaining participants who lack adherence to the treatment and routine follow-up schedule underwent further follow-up beyond 3 months.

Result: After 3 months of vitamin D supplement intake (dose = 3606.07 ± 2510.928 IU/d), the mean HbA1c was decreased significantly ($p = 0.02$) compared with baseline (9.34 ± 0.11 vs. 8.93 ± 0.12%) in participants who became vitamin D sufficient (median, 63.20 nmol/L), with no significant change in the total daily insulin dose ($p = 0.16$). Vitamin D levels correlated significantly and inversely with HbA1c levels ($p = 0.02$). HbA1c levels were significantly lower in the group of vitamin D sufficiency (median, 63.20 nmol/L) than the group of vitamin D deficiency (median, 41.60 nmol/L), 9.10 versus 9.90%, respectively ($p = 0.02$). The multiple regression analysis showed that the insulin dose was the only predictor of HbA1c level ($p < 0.001$). Another interesting result was that the daily insulin dose requirement decreased significantly with an increase in vitamin D level ($p = 0.03$). There was no significant change in HbA1c levels with correction of vitamin D deficiency after 6 and 9 months ($p > 0.05$).

Conclusion: The significant reduction in HbA1c levels in synchrony with the correction of vitamin D deficiency within 3 months demonstrated in this study indicates that vitamin D supplementation could play a positive role in glycemic control in patients with T1DM as adjuvant therapy. It also proves the need to assess and treat vitamin D deficiency in this population to maintain reasonable glycemic control.

OC4. Endocrine FGF19 Subfamily is Associated with Nonalcoholic Fatty Liver Disease

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Background: Nonalcoholic fatty liver disease (NAFLD) is a spectrum of liver disease with high prevalence in type 2 diabetes mellitus (T2DM) patients. The prevalence of NAFLD in T2DM is twofold higher than in nondiabetic patients; conversely, the risk of developing T2DM increases by fivefold in patients with NAFLD. Moreover, NAFLD can increase the risk of complications in T2DM, and reciprocally, the presence of T2DM in patients with NAFLD can enhance the progression to fibrosis. The prevalence of NAFLD is estimated to be between 6 and 33% globally. Fibroblast growth factor (FGFs) family members are involved in many functions. The endocrine FGF19 subfamily (FGF19, FGF21, and FGF23) is involved in regulating glucose, fatty acid, phosphate, and lipid metabolism. These proteins elicit their functions by activating four tyrosine kinase receptors, FGFR1–4, and their affinity to FGFRs varies between the tissues.

Methods: We measured circulating levels of metabolic markers FGF19, FGF21, FGF23, and adiponectin in patients with NAFLD, NAFLD + T2DM, and control subjects. We correlated these proteins with clinical and biochemical variables. NAFLD was diagnosed based on elevated alanine aminotransferase (>35 U/L) and/or ultrasound imaging. Circulating FGF19, FGF21, and FGF23 levels were measured in a fasting blood sample. Other surrogate markers of insulin resistance adiponectin were also measured.

Result: Anova analysis comparing the groups showed lower levels of FGF19 in NAFLD and NAFLD + T2DM ($p = 0.013$) groups compared with controls. Conversely, FGF21 was higher in NAFLD and NAFLD + T2DM ($p = 0.001$) groups than in controls. We could not detect FGF23 in control samples since the concentrations were below the detection limits of our assay. Detectable levels of FGF23 were found in NAFLD and NAFLD + T2DM groups suggesting that FGF23 levels are elevated in NAFLD and NAFLD + T2DM patients. Adiponectin, an insulin sensitivity marker, was lower in NAFLD and NAFLD + T2DM ($p = 0.000$) groups than in controls. Further, Pearson bivariate correlation analysis showed that FGF21 levels significantly correlated with markers of insulin resistance HbA1c, adiponectin, HOMA-IR, and QUICKI. FGF19 correlated with BMI, fat mass, visceral fat, and QUICKI.

Conclusion: A lower FGF19 and elevated FGF21 and FGF23 are associated with the development of NAFLD and NAFLD + T2DM. An increase in lipid accumulation in the liver triggers the dysregulated release of FGF19 subfamily members, which may be an early event in the development of metabolic syndrome in these patients.

OC5. Hearing Loss Among Patients with Type 2 Diabetes Mellitus: A Cross-Sectional Study

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Background: Hearing loss is an underestimated comorbidity among patients with type 2 diabetes.

Objectives: Our objective is to estimate the prevalence of hearing loss as a comorbidity associated with type 2 diabetes mellitus and assess the factors associated with this comorbidity.

Methods: This was a cross-sectional study in a tertiary care diabetes specialized center. A randomly selected sample of patients with type 2 diabetes, aged 30 to 60 years, was selected. All patients underwent clinical ear examinations and were referred for complete audiological evaluation. To assess the inner ear function, otoacoustic emission was used, tympanometry was used to assess middle-ear function, and pure tone air/bone audiometry was used to assess hearing sensitivity. Factors associated with hearing loss were assessed by multivariate logistic regression. Primary outcome measure was frequency, severity, and associated factors for hearing loss. Sample size was 157 patients.

Result: Of the 157 patients, 77 had hearing loss in both ears (49.0%), 13 in the right ear only (8.3%), 14 in the left ear only (8.9%), and 53 (33.8%) had normal hearing. A total of 181 ears had sensorineural hearing loss. Of them, 90 had a mild loss (49.7%), 69 had a moderate loss (38.2%), 16 had a severe loss (8.8%), and 6 had a profound loss (3.3%). Disabling hearing loss was observed in 46 (29%) patients. A higher frequency of hearing loss was present in patients with glycated hemoglobin levels of >8%. The multivariate logistic regression analysis revealed that the significant factors associated with hearing loss were longer diabetes duration, poor glycemic control, and hypertension.

Conclusion: Hearing loss is an underestimated comorbidity among patients with type 2 diabetes that warrants frequent hearing assessments and management. Strict glycemic and blood pressure control is essential to minimize the effects of diabetes on hearing sensitivity.

POSTERS PRESENTATIONS

P1. Adoption of Telemedicine Care for Osteoporotic Patients during Coronavirus Disease 2019 Pandemic

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Background: Patients with osteoporosis can be at increased risk of falls and fractures, requiring regular surveillance. The coronavirus disease (COVID-19) pandemic has impacted health care services around the globe and led to the utilization of telemedicine in different health specialties by phone or video calls. Our study is the first in Saudi Arabia to assess our health care system during the COVID-19 pandemic and to evaluate the satisfaction of our patients with the services provided and the overall bone health of our population during the pandemic.

Methods: This observational retrospective study was conducted between March 2021 and September 2021 at King Saud University Medical City, Saudi Arabia. The survey compared patients attending telemedicine clinics with in-person patients in terms of access and adherence to medications, the occurrence of new fractures, and overall satisfaction with this service.

Result: In total, 195 patients attended the telemedicine clinic, while 63 attended the in-person clinic. Exercise frequency was similar in both groups, although exercise intensity was better in the in-person group. 25(OH)D levels were stable in both groups. Both groups did not statistically differ in availability and delay of supply of osteoporosis medications. The majority of the patients in the telemedicine group were satisfied.

Conclusion: Telemedicine care was feasible and effective in managing osteoporotic patients during the COVID-19 pandemic. Such a service could be considered for managing disabled patients and those living in remote areas.

P2. Delayed Diagnosis of Type 1 Familial Hypocalciuric Hypercalcemia

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Background: Investigation of hypercalcemia lends itself to a very systematic approach of establishing hypercalcemia, defining the parathyroid status and exclusions of other less common causes if suspected before imparking on localization studies and surgical exploration. We present a challenging case.

Case Report: A 39 years old Emirati woman was following up with primary health care for a vitamin D deficiency. She was found to have an elevated serum calcium level in July 2020, and she was referred to our clinic for further investigation of hypercalcemia. The patient complained of generalized fatigue with mild lethargy, excessive thirst, and frequent urination without other dysuria symptoms. She was morbidly obese (height: 154 cm; weight: 98.5 kg; body mass index: 41.5 kg/m^2). Physical examination was unremarkable. A review of her biochemistry results showed elevated corrected calcium of 2.70 mmol/L (N:2.10–2.60), normal total calcium level of 2.44 mmol/L (N:2.10–2.60), low albumin level of 27 g/L (N:35–52), low vitamin D level 43.7 nmol/L (N:50–150), and kidney function test was normal with estimated glomerular filtration rate of 122 mL/min/1.73 m^2. Ultrasound showed normal kidney size and no evidence of renal stones. Documented past medical history was remarkable for primary hyperparathyroidism due to parathyroid adenoma managed by excision of right superior parathyroid adenoma and left lower parathyroid gland in May 2012. There was a History of vitamin D deficiency and obesity with gastric bypass surgery in 2014. The reviewed reports showed that in February 2013 nuclear scan showed a left lower parathyroid adenoma. None of her home medications could cause hypercalcemia. Family history was interesting for calcium disorders in her father, but the patient did not specify the exact history at this stage. Repeated biochemistry analysis in October 2020 showed a normalized corrected calcium level of 2.51 mmol/L, a normal total calcium level of 2.37 mmol/L, and a phosphate level of 1.09 mmol/L (0.8–1.45), as well as a magnesium level of 0.83 mmol/L (0.66–1.07). Serum intact parathyroid hormone (PTH) was elevated at 10.8 pmol/L (1.6–6.9), and the albumin level was low at 33 g/L.

Urinary calcium and urinary 24 hours calcium levels were low at 0.86 mmol/L (N: 1.70–7.50) and 1.63 mmol/24 h (N: 2.50–7.50), respectively. Twenty-four hours urinary creatinine level was also normal at 7.35 mmol/L(N: 7.00–10.00). The calculated calcium creatinine ratio was 0.0049, making the diagnosis of familial hypercalcemic hypocalciuria (FHH) less likely. We treated her with cholecalciferol 50,000 IU once per week. However, on a follow-up visit in March 2021, her PTH level remained elevated and hypercalcemia persisted in a fluctuant pattern up to 2.7 mmol/L. Therefore, we evaluated her for possible recurrent parathyroid adenoma. A nuclear scan and ultrasound of parathyroid glands revealed no pathology. The second opinion from the ENT-thyroid surgical team suggested that no further workup was indicated and medical management was recommended since there was no indication for further parathyroid surgery. In March 2021, her PTH was more elevated than the baseline of 14.8 mmol/L, with normal calcium at the upper limit and low vitamin D at 47.1 nmol/L. Further interrogations regarding more detailed family history revealed that her father had two parathyroid surgeries due to primary hyperparathyroidism and a history of renal stones and her paternal uncle died at a young age of an acute abdomen. Her genetic result revealed that the patient is heterozygous for the CASR gene for a sequence variant defined as c.2285G A, which is predicted to result in the amino acid substitution p.Arg762His. This variant can also be reported as NM_000388.3:c.2255G A (p.Arg752His) on an alternate transcript. These pathogenic variants in CASR have been associated with autosomal dominant hypocalciuric hypercalcemia type I, autosomal dominant hypocalcemia, and autosomal dominant and autosomal recessive neonatal hyperparathyroidism. Therefore, we established the diagnosis of FHH disorder type 1. The patient was instructed to inform her family members and advise them to proceed with the genetic evaluation. The patient was referred to a dietitian to modify her diet to reduce calcium intake.

Conclusion: We present a case of hypercalcemia caused by a mutation in the calcium-sensing receptor gene (FFH type 1). The late establishment of the final diagnosis could be partly attributed to the personal and family history of parathyroid adenoma and primary hyperparathyroidism in the past. An easier diagnosis could have prevented surgery.

P3. Prevalence and Risk Factors of Osteoporosis in Saudi End-Stage Renal Disease

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Background: Osteoporosis is characterized by decreased bone mineral density, thereby increasing the risk of pathological fractures. It is a common complication of chronic kidney disease. However, there are limited local data on the prevalence of osteoporosis in end-stage renal disease. The current study evaluated the epidemiology of osteoporosis in end-stage renal disease patients at a Saudi Arabian tertiary care center.

Methods: This cross-sectional retrospective study was conducted using data obtained between January 1, 2016, and December 31, 2019, at the Dialysis Center at King Abdulaziz Medical City, Riyadh, Saudi Arabia. End-stage renal disease patients aged >50 years and who underwent hemodialysis for at least 1 year were included. In contrast, those with documented metabolic bone disease and the absence of bone mineral density data were excluded.

Result: Sixty-four end-stage renal disease patients undergoing hemodialysis met the inclusion criteria. The patients underwent bone mineral density measurement at the treating physician's discretion.

The mean patients' age was 73 ± 11.5 years, and 76% were women. The overall prevalence of osteoporosis was 37.5%, similarly distributed among women and men (38.8 and 33.3%, respectively). In total, 9 of the 15 male patients (60%) and 24 of the 49 female patients (49%) had fractures. Twenty-five (39%) patients used glucocorticoids. Osteoporosis was most commonly identified in the femoral neck (26.2%), followed by the proximal femur (19.4%) and lumbar spine (18.8%). A high rate of osteoporosis was significantly associated with older age and being underweight.

Conclusion: End-stage renal disease patients demonstrated a high rate of low bone mineral density. The femoral neck was the most common osteoporosis site in this patient population, and advanced age and being underweight were possible risk factors for low bone mass.

P4. Acute Pancreatitis as A Rare Side Effect of Using Empagliflozin

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Background: Acute pancreatitis is a rapid-onset inflammatory process of the pancreas that may have local and systemic manifestations involving multiple organ systems. The most common causes of acute pancreatitis are gallstones and significant alcohol use. Other causes include drug-induced, hypertriglyceridemia, genetic predisposition, trauma, infectious, and idiopathic. Sodium-glucose cotransporter-2 (SGLT2) inhibitors are a class of oral hypoglycemic agents that the U.S. Food and Drug Administration (FDA) approves for treating diabetes and, later, for treating heart failure. SGLT2 inhibitors function through a novel mechanism of reducing renal tubular glucose reabsorption, reducing blood glucose without stimulating insulin release. Other benefits may include favorable effects on blood pressure and weight.

Case Presentation: Female patient of 56 years old with a past medical history of uncontrolled type 2 diabetes, dyslipidemia, deep vein thrombosis, and atrial fibrillation presented with a complaint of acute epigastric pain radiating to the back and then becoming a generalized abdominal pain, moderate in severity and not relieved by analgesics. It was also associated with nausea and vomiting. The patient denied any history of alcohol or smoking use. Her medications included sitagliptin 100 mg, metformin 2 g, gliclazide 60 mg, atorvastatin 20 mg, atenolol 50 mg, ASA 81mg, and more recently, empagliflozin 10 mg daily, which was started 7 weeks prior to symptoms onset. She had no significant family history. On arrival, the patient looked well, with stable vitals. Physical examination was significant with tenderness in the epigastric area. A laboratory workup revealed an elevated serum lipase of 3,851 units/L, serum amylase 3,755 units\L and abdominal computed tomography (CT) scan showed mild fatty atrophy, peripancreatic fat stranding, and free fluid adjacent to the tale and body, suggesting acute pancreatitis. Abdominal ultrasound showed that the gall bladder was without stones or pericholecystic fluid. The patient was admitted with the diagnosis of mild acute pancreatitis and underwent conservative management. After 2 days of admission, the patient's condition improved and was discharged on the same preadmission antidiabetic medication with OPD follow-up. After 3 weeks, she presented to the emergency department with the same complaint of acute epigastric pain radiating to the back and association with nausea and vomiting. With tenderness in the epigastric area and a laboratory workup revealing an elevated serum lipase and amylase, an abdominal CT scan confirmed acute interstitial pancreatitis. Again after 3 days of conservative management, she improved and was discharged, but this time her diabetologist discontinued empagliflozin, and she was started on insulin. She was following up with her diabetes outpatient clinic. There was no history of recurrence of pancreatitis.

Result: Worldwide, the incidence of acute pancreatitis ranges between 5 and 80 per 100,000 population, with the highest incidence being recorded in the United States and Finland. Acute pancreatitis is most commonly caused by gallstones or chronic alcohol use. Drug induce pancreatitis are a rare cause but must be considered. It is, therefore, important to determine the underlying etiology of acute pancreatitis to prevent the occurrence, recurrence, and complications of pancreatitis. Agencies such as the FDA and Health Canada have identified a potential safety issue and a possible association between SGLT-2 inhibitors and acute pancreatitis. However, further studies are required to confirm this association.

Conclusion: This case report emphasizes the possible association between SGLT2 inhibitors and acute pancreatitis. Physicians must be aware of this side effect as a possible cause of acute pancreatitis after excluding the most common etiologies. Also, the physician should inform the patient about the side effects of SGLT2 and the symptoms of acute pancreatitis and advise them to stop SGLT-2 inhibitors use in case such symptoms occur. Further studies are required to investigate this association.

P5. Evaluation of Dietary Intake of Moroccan Hemodialysis Patients Case-Control Study

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Background: Poor nutritional status of patients with chronic kidney disease (CKD) is the leading cause of poor clinical prognosis and mortality.

Aim: This study was conducted to assess nutritional status and analyze daily food rations and prevalence of protein energy wasting in hemodialysis (HD) patients with end-stage renal disease (ESRD) and compare them with control subjects.

Methods: The study involved 156 patients with ESRD and 160 healthy subjects without CKD who were selected as controls. Clinical data, anthropometric measurements, and two 24 hours dietary recalls were collected to evaluate the nutritional status and dietary intake.

Result: The mean energy intake in HD patients was 1906 ± 594 kcal per day. Only 35.3% of them were found compliant regarding the current recommended intake of energy density, 6.5% met the recommended minimum of 1.1 to 1.2 g/kg of protein per day. The HD patients had lower total calorie, protein, fat, and carbohydrate intake than controls, and the differences were statistically significant. The results showed a low consumption among HD patients compared with control subjects regarding mineral and vitamin intake. The protein and energy density were negatively correlated with age, body mass index, and waist circumference.

Conclusion: Assessing and monitoring HD patients' diet and nutritional status is very important. It might help to point out the irregularities and enable correcting them and hence would contribute to improvement in health and quality of life during the treatment.

P6. Assessment of an Educational Program to Improve Glycemic Control among People with Type 1 Diabetes

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Background: Health education on diabetes mellitus type 1 (T1DM) is necessary to achieve the treatment objectives and control goals. This includes insulin dosage optimization, which became possible through nutritional education, the use of a systematic assessment of carbohydrates, and the utilization of the insulin-to-carbohydrate ratio that leads to better glycemic control among patients.

Objective: This study aimed to assess an educational program for parents on how to calculate carbohydrates in different kinds of food, determine the appropriate insulin regimen to be given, and determine the impact of this educational program on glycemic control improvement.

Methods: An educational program on calculating the carbohydrates contained within food was administered to parents of children with T1DM who were attending Sabra Health Center, the United Nations Relief and Works Agency for Palestine Refugees in the Near East, Gaza, between August 2020 and August 2022. This educational program provided a booklet on calculation methods and a list of commonly used food with the number of carbohydrates within each portion.

Result: The study included 34 parents of children with T1DM. Among patients, there were 24 males (70.6%) and 10 females (29.4%). The mean age was $12.68 + 4.7$ years. Participants' age ranged from 2 to 21 years. Father and mother's educational levels were high generally. The median value of the fasting blood glucose measurement prior to intervention was 145 mg/dL compared with the postintervention measurement of 120 mg/dL. The mean value of Hba1c before the implementation of the educational program was $11.8 + 2.26\%$, with a median value of 11.75%. The mean value of Hba1c after the implementation of the educational program was $9.59 + 2.15\%$, with a median value of 9.25%. This means a mean reduction of 2.21%. The effect of educational intervention on Hba1c reduction was statistically significant ($p < 0.001$). Neither patients' age nor sex affected the level of improvement after the implementation of the educational program. However, female participants had low control of diabetes prior to the intervention ($p = 0.012$). Father and mother's educational level was statistically associated with HbA1c reduction ($p = 0.073$).

Conclusion: The implemented educational program has significantly improved glycemic control among type 1 diabetic patients, as shown by measuring HbA1c before and after the implementation. It is recommended to continue educating parents about managing their offspring's diabetes state. In addition, disseminating this educational program among other healthcare centers is highly recommended.

P7. Assessment of Vitamin D Levels in Children and Adolescents with Type 1 Diabetes

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Background: Limited studies revealed a high prevalence of vitamin D (25 OH VitD) deficiency among children with diabetes. However, the existing hypothesis that 25 OH VitD supplementation could play an appositive role in glycemic control in patients with diabetes indicates the need to assess and treat 25 OH VitD deficiency in this population.

Objectives: Our objective was to identify the 25 OH VitD status in children and adolescents with type 1 diabetes mellitus (T1DM) and to identify the correlation between 25 OH VitD levels and HbA1c levels.

Methods: A cross-sectional study was conducted in King Abdulaziz Medical City-Jeddah. Eligible patients ($n = 146$) were recruited. Serum 25 OH VitD <50 nmol/L was considered vitamin D deficiency.

Result: All participants were Saudis, 63.0% were children, and 37.0% were adolescents (52.7% were male and 47.3% were female). The mean of HbA1c levels was $9.85 \pm 1.79\%$ and for 25 OH VitD levels was 35.54 ± 13.88 nmol/L. The prevalence of 25 OH VitD deficiency was high (84.2%), with a mean of 25 OH VitD levels of 31.22 ± 9.82 nmol/L. There was no significant correlation between 25 OH VitD levels and HbA1c levels ($p = 0.14$). Additionally, the correlation was significantly negative between 25 OH VitD levels and daily insulin dose (IU per kg), diabetes duration, age, and body mass index ($p < 0.05$), while significantly positive with dairy product intake per milliliter per day ($p < 0.001$). Furthermore, multiple regression analysis demonstrated that age, daily insulin dose, and sex were the factors that were associated adversely and significantly with 25 OH VitD levels ($p < 0.05$).

Conclusion: The high prevalence of 25 OH VitD deficiency in children and adolescents with T1DM has been shown in this study. There was no significant correlation between 25 OH VitD levels and HbA1c levels. An interesting finding of the study was that daily insulin doses significantly and inversely correlated with 25 OH Vit D levels.

P8. Epidemiological Characteristics of Patients with Diabetes Invected with Coronavirus Disease 2019

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Background: Today, coronavirus disease 2019 (COVID-19) has become a global crisis, and patients with comorbidity such as diabetes are more problems than others. This study aimed to evaluate the demographic, clinical symptoms, and outcomes of diabetic patients with COVID-19.

Methods: In this descriptive study, 21 diabetic patients with COVID-19 who were polymerase chain reaction positive and had health records were selected. Information was collected based on patients' files and analyzed by SPSS software.

Result: In this study, 57.1% of patients were male and city residents. More than half of the patients were hospitalized, and 61.9% of patients had at least one other underlying disease, of which cardiovascular disease was the most common. The most common clinical symptoms of the patients upon arrival were sore throat and chills (47.6%) and cough (42.9%). None of the patients reported pulmonary involvement on admission. In total, 57.1% of patients mentioned contact history with other infected patients, and 9.5% were patients without symptoms and were only referred due to contact with patients. Finally, the mortality rate was 19%.

Conclusion: Considering that the patients did not have severe symptoms or even no symptoms when they entered the treatment centers, the hospitalization rate and, ultimately, the mortality rate in these patients were high; thus, treating and paying attention to patients with comorbidity, such as diabetes, is necessary.

P9. The Prevalence of Associated Autoimmune Diseases Among Adults with Type 1 Diabetes Mellitus: A Cross-Sectional Study

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Background: The relationship between type 1 diabetes mellitus (T1DM) and other autoimmune diseases has been known; however, neither the actual prevalence in the adult population nor clinical symptoms has not been determined locally. We aimed to determine the prevalence of associated autoimmune diseases (Hashimoto's thyroiditis, celiac disease, and adrenal insufficiency (AI) and also to evaluate the most reported symptoms and glycemic control assessment, microvascular complications, and hypoglycemia episodes.

Methods: A cross-sectional study of 251 patients with T1DM at the diabetic clinic of King Abdulaziz Medical City in Riyadh, Saudi Arabia, was conducted. Autoimmune serologies, including thyroid peroxidase (TPO) antibody and tissue transglutaminase IgA (tTG-IgA) antibody, were checked with hormonal studies such as thyroid-stimulating hormone morning serum cortisol, and short Synacthen test (SST) with duodenal biopsy results all reviewed if present. Patients were directly interviewed to evaluate for the most common symptoms (including hypoglycemia episodes) for the preceding 2 weeks. Glycemic control was assessed by measuring glycated hemoglobin (HbA1c). Microvascular complications (i.e., nephropathy and retinopathy) were estimated by looking at the urine albumin/creatinine ratio (ACR) besides the ophthalmologist visit notes.

Result: The mean age was 26.3 ± 7.7 years, and the mean duration of diabetes at the time of data collection was 12.2 ± 7.6 years, whereas the mean HbA1c was $8.9\% \pm 1.8\%$. The prevalence of hypothyroidism was 16.3%, and TPO positivity was discovered in 58.6% of the tested patients ($n = 70$) with equal prevalence among both genders ($p = 0.685$). tTG-IgA was noticed among 16.4% of the patients ($n = 164$) without significant differences among gender. A serum cortisol test was performed among 128 patients, 28.1% had suboptimal levels and 5.5% were deficient. Only four patients ($n = 15$) had suboptimal responses after SST. Nervousness and anxiety ($p < 0.001$), fatigue with weakness ($p = 0.018$), weight gain ($p = 0.017$), and cold intolerance ($p = 0.005$) were noted, which were statistically significantly higher among females. Weight gain was statistically significantly higher among the age group of >30 years ($p = 0.036$). ACR was collected in 199 (79.2%) participants for microvascular complication screening, with a mean of 27.7 ± 155.9 mg/mmol. Only 10 (5%) patients had microalbuminuria and 16 (8%) had macroalbuminuria; it was correlated significantly with diabetes duration ($p = 0.045$). A total of 132 (52.8%) patients were seen by ophthalmology, 28 (21.4%) had nonproliferative diabetic retinopathy, and 10 (7.6%) had proliferative diabetic retinopathy (PDR) that significantly correlated with the duration of diabetes ($p = 0.027$). During patient interviews, 187 (74.5%) reported symptomatic hypoglycemia events that correlated significantly with glycemic control ($p = 0.029$).

Conclusion: Autoimmunity in Saudi adults with T1DM was significant with equal prevalence among both genders and age groups with no or slight difference. Clinical manifestations of autoimmunity were higher in women. Diabetes chronicity and poor glycemic control were the major complications; therefore, early glycemic control is advocated. Regular screening for autoimmunity and its complications is recommended for type 1 diabetic patients. Autoimmunity was found to be almost similar to previous literature.

P10. Awareness of Primary Health Care Physicians About Diabetes Nutrition, Al-Madinah City, Saudi Arabia

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Background: Medical and nutritional therapy (MNT) is defined as nutritional diagnostic, therapy, and counseling services for disease management provided by a dietitian or nutrition professional.

MNT is important in preventing diabetes, managing existing diabetes, and preventing and slowing the rate of developing diabetes complications.

In Middle Eastern countries, 23.7% of adults have diabetes mellitus (DM). In Saudi Arabia, diabetes prevalence has increased in the last 20 years.

Methods: Study aim: DM is the most common metabolic disorder. Its prevalence varies widely and it is increasing dramatically in KSA. Moreover, due to the direct correlation between diet and diabetes management, MNT is a key complement to medical interventions in diabetes treatment.

This was a cross-sectional study of physicians in Al-Madinah primary health care.

All physicians working in Al-Madinah PHC were included.

The physicians who were not attending their clinic were not included.

A questionnaire was administered to physicians to report their awareness, and responses from these physicians were collected on the same sitting.

Result: The average correct-response rate of diabetes-related nutritional knowledge was 59%, higher than the rates for cardiovascular disease-related diets. More than 97% of the respondents knew that MNT could provide primary prevention for type 2 diabetes (T2D). More than half of the study participants knew that eating three meals a day is not desirable diet therapy for diabetic patients. However, 87.1% of respondents knew that a healthy, balanced diet is better for diabetic patients, and they recommended the following. The recommended diet for a person with diabetes is a healthy balanced diet of 87.1%. Recommended diet, not desirable diet, therapy is needed for diabetic patients. Eat three meals a day 51.5%. Sodium intake does not have to be restricted for diabetic patients was agreed upon by 32.7%. Nutrition therapy could provide primary prevention in T2D was agreed upon by 97.1%. The fact that T2D patients should restrict sucrose-containing foods is false was agreed upon by 25.7% Average correct response rate was 58.8%.

Conclusion: This study showed that the physician's mean correct answer score was 51.5%. It indicates that the physicians working in Primary care setting did not have sufficient knowledge of nutrition, resulting in their incapability in education and counseling and recommendation of special nutrition supplements to improve the patient's overall health status. The overall findings suggest a serious lack of nutrition knowledge among the physicians, and they do not have enough knowledge of nutrition to advise the patient properly. The present study indicates that physicians need more education in nutrition. Total 94.1% of current study physicians do not have formal training or have attended any course in nutrition.

P11. Diabetes among Cancer Inpatients: Prevalence, Epidemiological Characteristics, and Management at Sultan Qaboos University Hospital, Muscat, Oman

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Background: Cancer and diabetes are prevalent chronic diseases that commonly affect the same group of individuals since they share risk factors (Giovannucci et al, 2010). In addition, emerging data from epidemiologic studies pointed to a significantly higher risk of cancer in people with diabetes (Ohkuma et al, 2018). This leads to the hypothesis that several biological mechanisms link diabetes mellitus (DM) and cancer, in addition to the shared risk factors. Moreover, this coexistence restrains the effective management of both diseases, and for many patients, diabetes management takes a backseat to cancer treatment. This study examined DM prevalence among inpatients with cancer at Sultan Qaboos University Hospital (SQUH). In addition, we aimed to determine the frequency of comorbidities among this group of patients. Also, we attempt to evaluate the quality of diabetes control among inpatients with cancer. Highlighting the burden of these comorbidities may allow for better management of diabetes in cancer patients.

Methods: This study is a cross-sectional retrospective study conducted at SQUH in Oman for 2 years, from January 1, 2018, to December 31, 2019. Data were collected from SQUH Electronic Record. The collected data included the patient's demographics, such as age and sex. In addition, other data, such as diabetes complications, cancer type, other comorbidities, and diabetes medications, were included. Data were collected from the doctor's notes and biochemistry results.

Result: Among 985 cancer cases admitted to the oncology unit between 2018 and 2019, 274 patients had DM and the overall prevalence was 27.82%, 95% confidence interval (0.2504–0.3073). The most common cancer types were colorectal (27.7%) and breast cancer (67.7%) for males and females. Regarding the quality of diabetes control, most patients did not achieve the therapeutic goal for blood glucose and lipids. However, a higher percentage of patients achieved HbA1C, less than 7%, and the percentage reached 51%. The most prevalent complication in the sample was infections (20.2%), followed by hypoglycemia. Concerning DM treatment, 36.8% of the sample received both insulin and oral agents, while 23.5 and 27.5% received either insulin or oral agents. Chronic cardiovascular disease was the most common comorbidity in the sample.

Conclusion: There is a paucity of medical literature regarding the burden of the coexistence of diabetes and cancer. This study shows that diabetes was common among inpatients with cancer at SQUH. As the data indicate that the quality of DM care in cancer patients is suboptimal, addressing the clinical profile of this group of patients is essential in developing guidelines for achieving proper glycemic control.

P12. Differences in NLRP3 and Interleukins in Adults with Varying Levels of Glycemia

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Background: NLRP3 inflammasomes recognize pathogen- and danger-associated molecular patterns (PAMPs and DAMPs). They stimulate downstream signaling cascades and immune responses, increasing interleukin (IL) production and hence, the progression of inflammatory disorders, including type 2 diabetes (T2D). This study investigated the serum levels of NLRP3 protein and interleukins (IL-1a, IL1b,

IL-18, IL-33, IL-37) in Saudi adults with T2D and pre-diabetes (PD).

Methods: Clinical data from 407 Saudi adults (age 41.3Â±9.1) were retrieved from the master database of the Chair for Biomarkers of Chronic Diseases (CBCD), King Saud University, Riyadh, Saudi Arabia. Participants were stratified according to their HbA1C levels (>6.4% T2D, 5.7–6.4% PD, and <5.7 normoglycemic). HbA1c levels and interleukins were measured using commercially available immunoassays.

Result: In the normoglycemic controls, serum IL-1b levels were higher (1.6 [0.7–3.9] pg/mL) than PD (0.81 [0.71–1.97] pg/mL) and T2D (0.68 [0.66–2.5] pg/mL) groups ($p < 0.05$) as well as serum IL-18 (36.7 [7.6–89.2] pg/mL) than PD (11.3 [1.4–39.1] pg/mL) and T2D (11.9 [2.9–36.7] pg/mL) participants. Serum IL-37 levels were significantly higher ($p < 0.001$) in normoglycemic (2.91 [2.4–3.0] pg/mL) subjects than in PD (2.4 [2.1–6.9)] pg/mL) and lower than in T2D (6.0 [5.1–6.2] pg/mL) patients. No significant difference was seen in NLRP3, IL-1a, and IL-33 across all groups. Additionally, both IL-1a and triglycerides significantly predict NLRP3 levels by as much as 46% of the variances perceived ($R2 = 0.46$; $p < 0.01$), while TG and NLRP3 significantly predict ($R2 = 0.434$; $p < 0.01$) IL-a1 levels.

Conclusion: Pro- and anti-inflammatory IL (IL-1a, IL1b, IL-18, IL-33, and IL-31) are dysregulated in patients with PD and T2D. They may affect the innate immune response and might have promising effects in reducing chronic inflammation.

P13. Evaluation of Pubertal Development in Young People with Type 1 Diabetes

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Background: Type 1 diabetes affects the pubertal development of young diabetics.

Methods: A retrospective study involving 80 persons with type 1 diabetes aged <18 years hospitalized in our department. They benefited from a clinical evaluation of their growth using the growth curves defined by the World Health Organization and their pubertal status according to the Tanner stage.

Result: The mean age was 17.5 years, with a female predominance of 61%, and the onset of diabetes was 9 ± 2 years. The average HbA1c level was 10.8%. The pediatric transition was noted in 15% of patients. The pubertal delay was observed in 12 girls (15%) and six boys (7.5%). The average age at menarche was 12.5 years (10–16), and 47% of girls had irregular cycles. A stature delay was reported with nine boys and four girls. Underweight was noted in 18.7% of patients and overweight in 12% of girls. The pubertal delay was related to glycemic variability ($p = 0.02$), diabetes seniority ($p < 0.02$), and the frequency of hypoglycemia ($p < 0.01$). No significant association between insulin regimen and microangiopathies ($p = 0.13$).

Conclusion: Previous poorly controlled diabetes and hypoglycemia were predictors of delayed puberty. Puberty coincides with the transition period. Pediatrician–diabetologist coordination is needed to limit the loss of sight and minimize the impact on growth and puberty.

P14. Etiological Profile of Secondary Diabetes: A Descriptive Study Of 13 Observations

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Background: The discovery of diabetes requires a rigorous etiological investigation. Secondary diabetes is an etiological entity of diabetes and is mostly curable.

Methods: This was a descriptive cross-sectional study covering the period from January 1, 2019, to July 1, 2021. All following patients (inpatients or outpatients) with diabetes were collected. The parameters studied were epidemiological data, disease history, current treatments, mode of discovery and etiologies of diabetes, and clinical aspects of each etiological entity.

Result: Thirteen patients presented with secondary diabetes. The average age was 59.7 years, with extremes ranging from 32 to 86 years. As for family history, three patients had first-degree relatives with diabetes. Pure hyperglycemia was the main mode of discovery of diabetes in all 12 patients, and ketoacidosis was present in only one patient. Pancreatic cancer was the main etiology of pancreatic diabetes in six patients (43%). Cortico-induced diabetes was present in four patients. In these patients, the indication for corticosteroid therapy was lupus disease, rheumatoid arthritis, tubercular miliary disease, and neuropathy. Acromegaly was found in two patients with high insulin-like growth factor-1 levels, and an adrenocorticotropic hormone-independent Cushing's syndrome was found in one patient with bilateral adrenal hyperplasia on abdominal computed tomography.

Conclusion: Secondary diabetes is a prognostic factor for these conditions. The diagnosis requires a rigorous etiological approach.

P15. Freestyle Libre Flash Glucose Monitoring System Facilitates Sustainable Improvement

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Background: Our objective was to investigate glycemic control as assessed by ambulatory glucose profile metrics while patients with type 1 diabetes (T1D) wear flash glucose monitoring (FGM) system for 1 year.

Methods: This prospective study was performed among 187 patients with T1D (13–40 years) who switched from conventional finger pricking to an FGM system. Mean glucose level, low glucose events, hemoglobin A1c (HbA1c), and sensor scan frequency were collected at baseline, 3, 6, 9, and 12 months. Continuous glucose monitoring metrics, that is, glucose variability (GV) (%), glucose management indicator (GMI), mean time in range, time above range (TAR), time below range (TBR), the average duration of hypoglycemic events, and time sensor in active were collected at 3, 6, and 12 months.

Result: Compared with 3 months values, no significant changes ($p > 0.05$) were noticeable in terms of the GV, GMI, percentage in target (70–180 mg/dL), TAR (181–250 mg/dL), and percentage >250 mg/dL at 6 and 12 months. However,

significant differences were observed in mean glucose levels at 3 ($p = 0.027$), 9 ($p = 0.041$), and 12 months ($p = 0.32$) compared with baseline. When compared with the 3 monthly values, no significant change ($p > 0.05$) was noticeable in the mean glucose at 6, 9, and 12 months. Compared with the baseline values, significant changes were noticeable in terms of the low glucose events at 3 months ($p = 0.028$), 6 months ($p = 0.048$), 9 months ($p = 0.022$), and 12 months ($p = 0.038$). However, no significant changes were observed in percentages below 70 mg/dL (except 12 months, $p = 0.046$), the average duration of the hypoglycemic events, and the percentage of glucose level below 54 mg/dL. The baseline glucose monitoring frequency through BGM was 2.7/d. After the patients employed FSL, the frequency of monitoring increased at 3 months (8.9/d; $p < 0.0001$), 6 months (7.3/d, $p < 0.0001$), 9 months (7.1/d, $p < 0.0001$), and 12 months (7/d, $p < 0.0001$). Similarly, HbA1c showed a significant decline at 3 ($p = 0.044$), 6 ($p = 0.039$), 9 ($p = 0.031$), and 12 months ($p = 0.047$) compared with the baseline values.

Conclusion: Switching from conventional finger pricking to the FGM system improved markers of glycemic control to a substantial degree, and the effect was sustained for up to 1 year.

P16. Hormones Level Relation with Diabetic Retinopathy Among Type 2 Diabetic Women with Menopause

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Background: Hormonal transition among middle-aged women with type 2 diabetes may impact the development of diabetic retinopathy (DR). In this cross-sectional study, we aimed to assess the levels of estradiol, follicle-stimulating hormone (FSH), and luteinizing hormone (LH) in the presence of DR and their relationship with risk factors for DR among pre- and postmenopausal women with type 2 diabetes.

Methods: Serum levels of estradiol, FSH, and LH were measured using the immuno- assay technique. All statistical analysis was performed using SPSS software. From the 255 participants, diabetes duration-matched, 35 premenopausal, and 57 postmenopausal women were selected for analysis.

Result: The estradiol, LH, and FSH levels were similar in participants with and without DR among pre- and postmenopausal women with diabetes. Estradiol level was not related to the DR risk factors among women with type 2 diabetes.

Conclusion: In conclusion, the female sex hormone estradiol is not related to the presence of DR. Further prospective studies are necessary to reveal the mechanistic role of this hormone in DR development.

P17. Implementation of Diabetes Technology by the Insulin Pump Clinic During Coronavirus Disease 2019

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Background: In our institute, a diabetic clinic was established in 1990, and an Insulin pump therapy (IPT) clinic was initiated in 2017. Diabetic patients are usually treated with multiple daily insulin injections (MDIs). A transition from MDI to IPT usually occurs after a follow-up of 6 months.

Before the coronavirus disease 2019 (COVID-19) pandemic, the health service was in the form of outpatient clinic appointments. Before the switch from MDI to IPT, patients get proper education from our qualified nurse specialists about how to use the insulin pump and by a nutrition specialist for carb counting education. (1, 2)

During the initial wave of the COVID-19 pandemic, diabetes care was initially disrupted, and parents were worried about their children contracting the infection from hospitals. Subsequently, the majority of them decided not to attend the IPT clinic. (3, 4). To avoid the unavailability of medical care, we planned to move all patients to the virtual IPT clinic. This move required implementing a new technology platform to adapt to the situation. Such a move was essential to minimize hospital attendance, improve patients' adherence to the therapy, and allow them to get the service correctly. (5, 6) Subsequently, we developed a new way of caring for our patients. While they remain locked in their homes, they get proper training from qualified diabetic nurse specialists about how to use the insulin pump and upload it. At their office, health care providers can download generated reports containing the same patient's pump data. Certainly, the advancement in technology for diabetes devices, such as the integrated continuous glucose monitoring sensors, helped in such a move.

Additionally, patients were offered to contact their health care providers during working hours through a WhatsApp group.

Methods: Eligible pediatric patients were assessed for their adherence to the new technology through nine adherence items. The main adherence measures included a pump dashboard, settings, sensor, glucose meter, and daily reports. Also, patients were evaluated for their blood glucose changes. Additionally, their satisfaction with virtual meetings was examined.

Result: From March 15, 2020, to February 2021, 40 eligible patients were enrolled in the current trial. Applying virtual care in the IPT clinic expanded health service for others who have difficulties attending the clinic and improved patient adherence to the treatment protocol. Also, blood glucose was around the target, and HbA1c decreased by a mean of 2.2% compared with in-person visits.

Conclusion: The role of technology in diabetes mellitus care in the pediatric IPT clinic led to major progress in patients' adherence to the treatment protocol and their treatment outcomes. Also, patients were satisfied with the new technological advance, encouraging other patients to participate in this type of health service.

P18. A Rare Case of Simultaneously Developing Alopecia Areata Universalis and Type 1 Diabetes Mellitus

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Background: Type 1 diabetes is a chronic autoimmune disease characterized by insulin deficiency and hyperglycemia. Alopecia universalis is an uncommon alopecia areata involving hair loss over the entire body, including eyebrows and body hairs.

Case Study: Clustering of autoimmune disease is well established, and the occurrence of one autoimmune disorder might provide evidence that an accompanying disease is also an autoimmune disorder. The type of diabetes mellitus in the present case was insulin dependent, and both diabetes and alopecia were observed. The autoimmune mechanism is important.

Conclusion: Insulin-dependent diabetes mellitus is occasionally complicated by alopecia areata, and diabetes mellitus is relatively common in patients with alopecia areata. Both disease states have been described as a manifestation of multiple endocrine autoimmune syndromes. Although alopecia areata totalis or universalis may occur in patients with insulin-dependent diabetes mellitus, simultaneous development of both diseases seems rare. The autoantibodies to the islet cells and lymphocyte infiltration into islets are seen in humans. Alopecia areata and its severe forms, alopecia areata totalis, and universalis are also related to autoimmunity because lymphocyte infiltration to the hair follicles is often present.

P19. Is Fatty Pancreas Prediabetic?

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Background: Nonalcoholic fatty pancreatic disease (NAFPD) or fatty pancreas emerged as a health problem parallel to obesity. NAFPD can lead to diabetes mellitus, chronic pancreatitis, pancreatic insufficiency, and pancreatic adenocarcinoma of the pancreas. Aim of the study is to explore the role of a fatty pancreas as a pathologic step in the development of DM.

Methods: Eighty-eight patients with NAFPD recruited were divided into four groups, group (1) diabetic patients with normal body mass index (BMI), group (2) diabetic patients with BMI over 25 kg/m^2, group (3) nondiabetic individuals with normal BMI, and group (4) nondiabetic individuals with BMI over 25 kg/m^2. All routine investigations were done, including a lipid profile and liver functions. NAFPD was diagnosed by abdominal ultrasound, Toshiba using a convex probe compared with the right kidney and liver (grades from 0 to 3). Statistical analysis SPSS version 22 was used.

Result: Mean age was 44.08 ± 12.41 years for all subjects. BMI was 29.73 ± 8.15 kg/m^2. Males were 73%, while females were 27%. NAFPD was present in nonobese and non-DM in grades 1, 2, and 3 (22.7, 27.3, and 22.7%, respectively). While NAFPD was present in DM, nonobese in grades 1, 2, and 3 (22.7, 31.8, and 45.5) means an increase in percentage of DM development, especially in grades 2 and 3. NAFPD was present in obese non-DM as grades 2 and 3 (31.8 and 68.2%), and in DM, obese as follows (18.2% and 81.2%), which means an increase in percentage of DM development.

Conclusion: NAFPD is the first step in the development of DM. It is an alert sign for health institutes.

P20. Knowledge about Diabetes Mellitus among Registered Nurses Working in a Tertiary Hospital

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Background: Diabetes is an abnormally high blood sugar level triggered by a lack of insulin production. Nurses must have a solid understanding of diabetes to give the best care possible to their diabetic patients. Therefore, registered nurses at a tertiary hospital in Bahrain were invited to complete a survey on their knowledge of diabetes mellitus.

Methods: This research used a quantitative cross-sectional design. Participants were a convenience sample of 393 nurses with direct contact with patients. Nurses without direct contact with patients and nurses in administrative positions were excluded. All participants completed an anonymous questionnaire that assessed diabetes knowledge.

Result: All 393 questionnaires were answered. Most participants were female (80.4%), had a bachelor's degree (81%), and worked in critical care areas (37.9%) or inpatient units (36.6%). Participants' mean age was 32.04 years, and the mean total years of work experience was 8.66 years. The majority of participants (66.2%) had average knowledge of diabetes. Information deficit (incorrect answers above 50%) was noted for five questions.

Conclusion: This study indicated that nurses working in a tertiary hospital in Bahrain have average knowledge of diabetes. Regular appraisal of nurses' knowledge, relevant education or training, and increased access to updated knowledge about diabetes are necessary to increase nurses' knowledge of diabetes. More research is needed to assess nurses' attitudes and practices related to diabetes.

P21. Patient Satisfaction with Virtual Care Compared to Clinic Visits

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Background: In 2019, coronavirus infection (COVID-19) appeared suddenly and started spreading rapidly worldwide. World health organization (WHO) declared a global pandemic in March 2020 after confirming COVID worldwide. Like many countries, Saudi Arabia declared a nationwide lockdown to contain the COVID-19 virus infection. Routine appointments in the clinic were canceled, and many patients quickly found themselves with little or no medical support during the shutdown. Diabetes is a chronic disease that needs comprehensive health care, such as health education, glycemic control, and evaluation of micro and macrovascular complications. People with diabetes risk more severe outcomes when infected with the COVID-19 virus. Depriving diabetic patients' regular follow-ups and management lead to uncontrolled diabetes and many chronic complications. Marinating uninterrupted health care providers is essential when managing people with diabetes. Greater reliance on virtual clinic modes was needed to continue the routine patient care for people with diabetes during the pandemic. The diabetes care center at the Tertiary care hospital in Jeddah started to implement a virtual clinic to follow up with patients during the pandemic. Diabetic educators regularly ran virtual clinics to help to manage blood sugar control and deliver medications to homes if necessary.

Satisfaction is an important indicator of the quality of health care service. Acceptance and satisfaction of health care consumers are considered the successful implementation

and adoption of virtual clinic services. The present study was conducted to evaluate patient satisfaction and acceptance of virtual clinics to in-person clinic visits to determine the continuation of the virtual clinic after the pandemic as part of diabetic patient care.

Methods: This cross-sectional observational study was conducted in diabetic educator clinics under the diabetes and endocrinology department of the tertiary care hospital Jeddah in Saudi Arabia. The study carried over for 6 months during the COVID-19 pandemic. The study population was diabetic patients above the age of 15 years registered in a diabetic educator virtual clinic during the study period. The patients were contacted by phone during the virtual clinic, and responses to the clinical cross-examination tool were recorded.

The questionnaire was discussed with the patients to reach a consensus of asking/explaining particular questions in case the patient needed help understanding such questions. Informed consent was taken for participation in the survey. Patients' preferences for in-person, virtual, or combined in-person and virtual clinics were recorded. Reasons for not preferring virtual clinics were also recorded.

Result: Total number of 635 persons with diabetes completed the cross-examination tool questions. When asked about preference between virtual and in-person clinics, 50.8% preferred in-person and 49.2% virtual clinics. Preference for combined virtual versus virtual clinics is high percentage 88.9% preferred combined in-person and virtual clinics. The reasons for not preferring the virtual clinic were irregular appointments during the pandemic and uncertain times of calls from virtual clinics.

Regarding satisfaction with treatment plans by virtual clinic telephonic calls, 543 were satisfied by virtual clinic calls and 34 were not satisfied. The reason for not satisfying was difficulty understanding instructions by phone and feeling the necessity to be personally present in the clinic when new treatment plans are planned.

Conclusion: The persons with diabetes who participated in this study showed moderate satisfaction levels with virtual care and high satisfaction with a combination of virtual and in-person clinics. Particularly among females' a higher satisfactory response was recorded. Future large-scale multicenter studies are required to decide the continuation of virtual care as a part of outpatient service after the COVID-19 pandemic.

P22. Prevalence and Risk Factors for Urinary Incontinence among Women with Diabetes

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Background: Urinary incontinence (UI) is a detected complication of diabetes mellitus. Studies about UI among diabetic women in Saudi Arabia are limited. This study aimed to assess the prevalence of UI in women with diabetes in Taif city, Saudi Arabia, and to determine its risk factors.

Methods: A cross-sectional study was done on 398 diabetic women who attended the diabetes clinic at Prince Mansour Military Hospital, Taif city, Saudi Arabia. Data were captured, including sociodemographic characteristics, type and duration of diabetes, chronic diseases, parity, BMI, neuropathy, retinopathy, nephropathy, level of HbA1c, and fasting blood glucose (FBG).

Results: The prevalence of UI was 34%. In the last 4 weeks, 48.9, 25.9, 6.7, 12.6, and 34.1% of studied women had frequent urination and urine leakage drops, difficulty in urinating or emptying, pain or discomfort in the lower abdomen, leakage related to urgency, and leakage related to physical activity, respectively. Among them, 11.1, 11.9, 12.6, 19.3, 15.6, 19.3, and 20.7% suffered effects of UI on the ability to do household chores, physical recreation, entertaining activities, ability to travel in a car or bus for more than 30 minutes, participation in social activities outside, emotional health, and feeling frustrated, respectively. Participants older than 50 years, with type 2 diabetes, urinary tract infections, ovarian cysts, neuropathy, high HbA1c, and high fasting blood glucose, had a significantly higher risk of UI. Participants' age and high HbA1c level were independent predictors for UI

Conclusion: There is a need for educating women with diabetes about UI and methods of management.

P23. Reasons for Reluctance to Initiate Insulin among Patients with Type 2 Diabetes

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Background: Type 2 diabetes is characterized by a progressive decline in beta cell function. It has been estimated that half of the newly diagnosed patients with type 2 diabetes will require the initiation of insulin therapy after 6 years after diagnosis. Even though insulin therapy is very efficacious in achieving good glycemic control, many patients are still hesitant and reluctant to initiate it. This study investigates the most common reasons for reluctance to initiate insulin therapy among patients with type 2 diabetes who require insulin from their perspectives. It also tries to suggest practical solutions to overcome this problem in medical practice.

Methods: This prospective observational study was conducted on 300 patients from a private specialized endocrine practice between September 2019 and September 2021. The participants were type 2 diabetes mellitus patients who met the criteria for initiation of insulin therapy according to the consensus statement by AACE on the comprehensive type 2 diabetes management algorithm 2020. Patients with type 2 diabetes who needed insulin were offered insulin initiation, followed by a comprehensive explanation of the importance of insulin therapy at that stage of their disease, potential benefits, and possible side effects. Those who refused insulin initiation were included in the study. Their demographic data were collected, and their diabetes duration was recorded. Glycosylated hemoglobin was measured. An open question on the reason for insulin therapy refusal was asked and recorded. According to the consensus statement, patients were offered alternatives to insulin therapy to maximize their glycemic control. Then, patients were followed up after 3 and 6 months by glycosylated hemoglobin. Those who had their diabetes controlled were asked to continue on the same management. While those who were still having suboptimal control were offered insulin initiation for the second time, their responses were recorded. Verbal informed consent was taken from each participant. Data were collected and stored on an excel sheet. Data were presented as simple frequencies, means, and standard deviations.

Result: A total of 300 participants completed the study. Of the 166 (55.3%) were females. The average age and duration of diabetes were 55 ± 10.9 years and 8.6 ± 0.3 years, respectively. Most participants finished primary school (39.6%) and secondary school (35.7%), while only 15% were

illiterate. Those who live in urban areas represent 172 (57.3%) of the total study group. The average glycosylated hemoglobin was 11.7 ± 0.4%. The three most frequent reasons for insulin initiation reluctance were needle phobia, fear of dependency on insulin, and commitment, with the following frequencies, respectively, 114 (38%), 54 (18%), and 37 (12.3%). Other less frequently recorded reasons include insulin represents the last stage of diabetes management, previous negative family experience, fear of hypoglycemia, lack of knowledge on insulin proper use, previous insulin therapy failure, anxiety, insulin causes complications, insulin causes blindness, family refusal to use insulin, fear of weight gain, insulin's odor, they hate the name of insulin, fear of stigmatization by the community, they believe insulin does not work, bleeding at the injection site, insulin causes heart disease, and lastly, insulin delays wound healing. On follow-up visits after 3 and 6 months, 135 (45%) participants had their glycosylated hemoglobin improved and returned within the target range (below 7%). On the contrary, 165 (55%) of the patients had their glycosylated hemoglobin out of the target range despite being on the maximum tolerated doses of oral antidiabetic medications. Of those who could not achieve the target control range without insulin, 84 (50.9%) still refuse insulin use.

Conclusion: Type 2 diabetes is a persistent disease characterized by insulin resistance and progressive decline in beta cell function. Hence, many patients with type 2 diabetes may need insulin to control their diabetes. Despite the advance in insulin synthesis and the availability of different formulations of modern insulin, health care providers still struggle with insulin initiation for their patients.

P24. A Record High Hba1c!

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Background: Glycated hemoglobin (HbA1c) is derived from the nonenzymatic addition of glucose to the amino group of hemoglobin. It reflects the average blood glucose over the past 2 to 3 months. It was first used in routine clinical laboratories around 1,977 and is considered one of the best methods to monitor glycemic control. Since then, many methods have been implemented to measure it. Levels above 20% are rarely seen. The author reports a case of 56 years old female with type 2 diabetes who presented with the highest-ever recorded HbA1c of 61.5%. This report will briefly discuss pitfalls in HbA1c measurement.

Case Report: A case of 56 years old female who had diabetes for 10 years was presented. The patient was seen at a specialized diabetes center. She came seeking insulin and reported nonadherence with her basal-bolus insulin regimen due to financial issues and neglect. She denied any symptoms of headache, nausea, or vomiting. However, she admitted she had polyuria and polydipsia. Besides basal-bolus insulin, she was on metformin 2 g/d. She was on sulphonylurea until 3 years ago when she started to use insulin. Her surgical history was unremarkable. She did not drink alcohol or smoke. She was conscious and oriented on examination with no tachypnea or Kussmaul breathing. Her MBI was 24 kg/m^2. Blood glucose was 782 mg/dL, full blood count, B12, folate, iron studies, renal function, and liver function were all normal. Hb electrophoresis was unremarkable. The lipid profile showed low-density lipoprotein colestrol of 180 mg/dL and triglyceride of 202 mg/dL. Urine ketone was negative.

HbA1c was 61.5% as measured by BioRad-D10 (HPLC; Fig. 1). On review of her medical record, she missed regular follow-ups. Her visit was 2 years ago, with an HbA1c of 11.8%. The patient was admitted for glycemic control and discharged after 3 days with basal-bolus insulin.

Conclusion: Here is an interesting case of asymptomatic higher-ever recorded HbA1c in a living human being. Several causes of inappropriately high HbA1c include iron, B12, and folate deficiency. Other causes, such as alcoholism, uremia, hyperbilirubinemia, hypertriglyceridemia, asplenia, and drugs such as aspirin, might be the culprit. All of these have been excluded in the case. The lack of availability of insulin in developing countries is still a major barrier to adequate glycemic control. In addition, patient self-neglect and failure to regularly follow-up might result in drastic outcomes. The estimated average blood glucose level for this patient-derived from her HbA1c is 1,710 mg/dL. Despite that, she came to the diabetes center walking without any concerning symptoms.

P25. The Relation between Diabetic Peripheral Neuropathy and Coronary Heart Diseases

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Background: Diabetes mellitus is a well-known cardiovascular risk factor in developed countries. Diabetic peripheral neuropathy (DPN) is a popular, incapacitating, and distressing complication that occurs in nearly 30 to 50% of patients with diabetes. The prevalence of coronary artery disease (CAD) in the diabetic population ranges from 9.5 to 55%, whereas it is considered 1.6 to 4.1% in the general population. Type 2 diabetes mellitus is a chief risk factor affecting CAD.

Methods: A prospective, cross-sectional study was conducted on the inpatient of Specialized Medical Hospital, Mansoura University, for 2 years. The study was conducted on 118 patients with type 2 diabetes mellitus. Patients were divided into two groups: 66 patients with cardiac ischemia on coronary angiography. This group was divided into three groups according to Gensini score (GSGS): mild ischemia: GSGS < 20, moderate ischemia: GSGS = 20 to 48, and severe ischemia: GSGS> 48. Fifty-two patients with normal coronary angiography. Nerve conduction studies were performed in the electrophysiology laboratory at Mansura Specialized Medical Hospital using VikingQuest (Nicolet, Natus Neurology, United States). We studied four motor nerves bilaterally (Peroneal, Tibial, Median, and Ulnar nerves). We recorded each motor nerve's compound motor action potential amplitude, distal latency, and conduction velocity. We studied three sensory nerves bilaterally (Sural, Median, and Ulnar nerves). We recorded sensory nerve action potential amplitude and peak latency for each sensory nerve.

Result: The median age of the studied groups was 50.5 for normal coronary angiography versus 59 for the abnormal coronary angiography group and the median age at the onset of DMDM was 38 for normal coronary angiography versus 44 for the abnormal coronary angiography group. Median HbA1c was 8.3 for the normal coronary angiography group versus 9.5 for the abnormal coronary angiography group. All showed statistically significant differences with p-value <0.001. The study shows a statistically significantly higher GSGS, nonzero GSGS, coronary lesion >70%, and a statistically significantly lower EF% in those with abnormal NCS. At the same time, the majority with normal NCS have no involvement of coronary vessels.

Conclusion: There is a strong association between CAD and DPN and their severity. So, DPN can be used as a predictor of myocardial ischemia in clinical practice, especially silent myocardial ischemia.

P26. The Relationship of HbA1c to Time in Range and Glucose Management Index in Patients with Diabetes in Tertiary Care.

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Background: HbA1c has been used as a marker of glycemic control and an indicator of the risk of developing diabetes complications. However, it has its limitations, and the use of continuous glucose monitoring and flashes glucose monitoring (FGM) metrics such as time-in-range (TIR) and glycemic management indicator (GMI) have been recently adopted with the advantage of shorter periods for reassessments. Nonetheless, the correlation between TIR and HbA1c has not been studied in Saudi patients with diabetes. This study aimed to assess the correlation between HbA1c and TIR in patients with diabetes using FGM devices (FreeStyle Libre Device) in the Saudi population.

Methods: This is a retrospective study that looked at the data of patients with diabetes using freestyle libre between January 2020 to June 2022. Institutional Review Board approved the study. SPSS was used for statistical analysis.

Result: Data were available for 327 patients; the mean age was 33 ± 17.1 years old, 55.7% were females, 77% had type 1 diabetes (T1DM), 22% had T2DM, 1% had latent autoimmune diabetes in adults and mean HbA1c was $7.8 \pm 1.3\%$ while average blood glucose was 9.9 mmol/L (178.2 mg/dL). Active sensor usage time was $86.5\% \pm 10.3$, glucose variability was $39.7 \pm 18.1\%$ and study subjects had TIR of $52.7 \pm 17.7\%$ time above range of $38.9 \pm 7.9\%$, and time below range $5.0 \pm 5.3\%$. Patients with T2DM had a significantly higher TIR ($62.7 \pm 20.6\%$) than patients with T1DM ($49.9 \pm 15.8\%$; $p < 0.0001$). Similarly, males had significantly higher TIR ($54.9 \pm 18.1\%$) than females ($51.0 \pm 17.3\%$; $p = 0.044$). There was a significant correlation between laboratory HbA1c and both TIR and GMI with R2 values of 0.78 and 0.83, respectively, with p-value < 0.001 for both.

Conclusion: The obtained regression model suggests that TIR and GMI are reliable predictors of laboratory Hb1Ac in our patient population. Thus, they could be used to follow patients and modify treatment.

P27. The Role of Diabetic Education in Glycemic Control in Children with Type 1 Diabetes

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Background: The perfect control of Type I diabetes mellitus (T1DM) in children could depend on other factors rather than insulin-like diabetic education. We aim to study the importance of diabetic education in glycemic control in children with T1DM.

Methods: This review was recruited at Nizwa Hospital, Sultanate of Oman, from September 2020 to November 2021. The diabetic education service started on February 2021 with direct meeting education every 2 to 3 weeks plus daily availability through WhatsApp. A total of 48 patients were included, 28 females and 20 males, ages 8 to 13 years. Families of all children had almost the same social and educational levels. Comparison had been made among them before and after establishing the diabetic education service (5 months before and ten months after) based on glucose level, HbA1c levels, emergency phenomena, and compliance to insulin use every 3 months at outpatient department.

Result: Good glycemic control was noted in children who adhered to the diabetic education service. The adhered number was 36 patients (75%). The remaining 12 patients (25%) who neglected the education follow-up had very poor glycemic control, and 4 developed moderate DKA. Before starting the education service, good control was noted only in 22 patients (45%) of the total number of recruited children.

Conclusion: Diabetic education in children has a great role in good glycemic control, which is easy to apply in each medical institute and community.

P28. Was Coronavirus Disease 2019 Era a Blessing in Disguise for the Patient?

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Background: The concerns of all patients, especially the elderly, should be addressed, as these can be useful for their diagnosis and management. In this era, continuous blood glucose monitoring (CGM) is quite a helpful and accurate tool for glycemic regulation.

Clinical Case: A 75 years old man presented with type 2 diabetes (>30 years), hypertension, primary hypothyroidism, dyslipidemia, mixed polyneuropathy, iron deficiency anemia, and benign prostatic hypertrophy. On follow-up in our center in March 2020, his blood pressure (BP) and self-monitoring blood glucose readings at home were observed to be high. He had a history of subdural hematoma, intraventricular hemorrhage with hydrocephalus, and subsequent shunt placement. The patient was on insulin glargine, 10 units daily, oral Gliclazide MR 120 mg, and linagliptin 5 mg for his diabetes. Also, he was on amlodipine 5 mg, valsartan 160 mg, levothyroxine 100 mcg, atorvastatin, aspirin 81 mg, calcium carbonate 60 mg, twice daily iron fumarate 200 mg, and cholecalciferol 10,000 IU/wk. He was fully conscious, well-oriented, and cooperative, of average build and height. BP was 170/70 mm Hg, pulse 93/m, RR 18/m, O2 sat 100%, afebrile, and BMI 24.96 kg/m^2. Fundoscopy was normal. The systemic exam was unremarkable, apart from dry feet and impaired monofilament and vibration testing. CBC-Hb% was 13.1 g/dL (12.6 before), MCV 93.8fl, ferritin 10.5 µg/L (30–400), Vit.B12 270 pmol/L (145–637), and HbA1c 8% (6.4 in Feb.2020). His renal, liver, and thyroid functions were intact. Albumin creatinine ratio was 12.23 mg/g (0–30). Nerve conduction study was consistent with mixed polyneuropathy. He continued to follow up physically even during the coronavirus disease 2019 (COVID-19) crisis as he was very concerned about the elevated self-monitoring of blood glucose and BP values. In June 2020, the patient and his daughter were educated about Libre (continuous glucose monitoring (GCMS) usage. His gliclazide dose was optimized, and injection glargine, 10 units daily, was started. The antihypertensives were also adjusted. On the patient's follow-up in August 2020, his time in the range had improved to 80% (33% in June 2020), average glucose was 147 mg/dL (200 before), glucose variability was 27.8% (28.9), hypoglycemia (54–79 mg/dL)

was 1% (0). The patient's last follow-up was on June 6, 2022. His HbA1c has increased from 7.3% (on 14.09.2021) to 8.3% on June 30, 2022. He was compliant with the diabetes regime but had stopped using the Freestyle Libre sensor.

Conclusion: Physicians should always heed the patient's complaints, which can help solve their problems. Continuous blood glucose monitoring can be more efficient than glycosylated hemoglobin and self-monitoring blood glucose to detect the correct glycemic status. The case signifies the advantage of meticulous CGM usage during the COVID-19 pandemic, which resulted in reasonable glycemic control.

P29. Personal Hygiene and Sodium-Glucose Cotransporter 2 Inhibitors

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Background: Our objective was to study the effect of washing the perineal area with water only after every act of micturition in preventing genital infection from sodium-glucose cotransporter inhibitor (SGLTi) usage. Patients in the age group of 40 to 55 years were included.

Methods: Thirty type 2 diabetes patients who were uncontrolled on metformin and glimepiride of various strengths and dosage schedules were divided into two groups of 15, and the two groups were named intervention and control groups. Both groups were given dapagliflozin 10 mg for the first time. The intervention group was taught about the maintenance of personal hygiene by washing the perineal area with water only and counseled for strict maintenance.

In contrast, the control group was not counseled for personal hygiene maintenance. Both groups were followed up weekly for 4 months to detect any perineal infection following SGLT2i usage.

Result: No perineal infection was noted in the intervention group. Nevertheless, in the control group, perineal infection was noted in all 15 patients, most of which were fungal infections. Eleven patients had tinea of the genital area, and four patients had mild urinary tract infections, managed with oral medications on an OPD basis.

Conclusion: Type 2 diabetes mellitus patients on dapagliflozin can prevent perineal infection with the proper maintenance of personal hygiene of the genital area.

P30. The pattern of Lipid Profile among Saudi Adults with Type 1 Diabetes Mellitus

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Background: Dyslipidemia is prevalent in adults with type 1 diabetes, and it can lead to the worse presentation of chronic complications such as retinopathy, nephropathy, and neuropathy. This study aims to determine the pattern plus frequency of dyslipidemia in adults living with diabetes followed up at a different clinic in King Abdulaziz Medical City-Riyadh and to identify associations with demographic and clinical characteristics.

Methods: The study is a retrospective cross-sectional chart review of 514 adults with diabetes followed up in a tertiary health care facility in central Saudi Arabia. Demographic data were retrieved from the electronic medical records, and all subjects were checked for fasting lipid profile, HbA1c, and thyroid-stimulating hormone levels.

Result: In total, 514 subjects aged 18 to 65 years were studied (mean age: 26.1 ± 7.1 years). There were 318 (62%) females in the sample, and their mean age significantly differed from the mean age of males ($p = 0.01$). The mean duration of diabetes was 12.8 ± 6.9 years. Prevalence of lipid abnormalities included abnormal low-density lipoprotein (LDL; 70%), hypercholesterolemia (23%), abnormal high-density lipoprotein (HDL; 8%), and hypertriglyceridemia (5%). Abnormal HDL was significantly higher in males ($p \leq 0.001$). There was no difference in the prevalence of other lipid abnormalities between the two genders. There was no statistically significant difference in the prevalence of lipid abnormalities according to the age group < 25 years. There was no statistically significant difference in the mean of various lipids levels between the two genders. One hundred and forty three (27.8%) subjects had more than one lipid abnormality. There was a statistically significant difference in the mean HbA1c between males and females ($p = 0.001$). Otherwise, there was no statistically significant association of lipid abnormalities with gender, age, diabetes duration, and weight category.

Conclusion: The commonest lipid abnormality was high LDL cholesterol. About a third of our subjects had more than one lipid abnormality. Poor glycemic control was linked to abnormal lipids profile. Local programs must consequently aim to screen and intervene early to delay and prevent future serious vascular complications related to non-treated dyslipidemia.

P31. Patterns of Dyslipidemia and Cardiovascular Risk Associated with Hypothyroidism

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Background: Hypothyroidism affects up to 5% of the general population, with a further estimated 5% being undiagnosed. Over 99% of affected patients suffer from primary hypothyroidism. Dyslipidemia is a risk factor for the development of atherosclerotic cardiovascular disease. Hypothyroidism is one of the most common causes of secondary dyslipidemia.

Objectives: We evaluated the prevalence of dyslipidemia in Sudanese patients with hypothyroidism to determine the patterns of dyslipidemia associated with hypothyroidism in Sudanese patients and to assess the cardiovascular risk associated with dyslipidemia in patients with hypothyroidism.

Methods: This is a hospital-based cross-sectional study at Professor Al-Mahdi M. Ali Center for Diabetes and Endocrinology in Khartoum between January and October 2022. Sixty subjects with hypothyroidism were recruited

from the follow-up clinic. Sixty age and sex-matched subjects were used as control. Thyroid function tests [thyroid-stimulating hormone (TSH), free thyroxine (FT4), and triiodothyronine (FT3)] and serum lipid profile were measured in both cases and controls. The results were analyzed with SPSS version 21.

Result: The study included 120 patients, divided into 60 cases with other 60 age- and sex-matched control. The female-to-male ratio was 72% (43 patients) to 28% (17 patients). The age range was 20 to 55 years in both groups. All patients in the case group had high TSH, with a mean of 5.7 mIU/L, low FT4, with a mean value of 0.72 ng/dL, and low FT3, with a mean of 0.72 pg/mL. The lipid measurements in the case group profile demonstrated a high TC average of 279 mg/dL. The associated cardiovascular risk was calculated using the Medindia calculator system, which revealed a high cardiovascular risk when we took individual lipid profiles.

Conclusion: Our study showed that all patients with overt hypothyroidism had elevated serum lipid levels, namely TC, TG, and LDL, with low HDL levels. This dyslipidemia foreboding high cardiovascular risk.

P32. Prevalence and Association of Obesity, Depression, and Psychological Stress in Saudi Arabia

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Background: Depression, stress, and obesity are major worldwide problems affecting public and personal health. Research has shown an association between these diseases, by the presence of depression and stress in obese patients twice than normal weight people.

Methods: This is a cross-sectional study conducted among the general population living in Saudi Arabia. A self-administered questionnaire was distributed among the population using an online platform. The questionnaire includes sociodemographic characteristics (i.e., age, gender, marital status, etc.) body mass index classification, Patient Health Questionnaire (PHQ-9), and International Stress Management Association stress questionnaire.

Result: Out of 1,075 respondents, 72.1% were females and 52.6% were aged between 21 to 30 years. 20.6% were classified into the obese group. The prevalence of depression was 39.4%, while the prevalence of psychological stress was 77.8%. There was a significant relationship between depression and stress, but the relationship between depression and overweight/obesity did not reach statistical significance. However, psychological stress had a significant relationship with overweight/obesity. Independent significant predictors of increased depression were gender female, associated chronic disease, and psychological stress.

Conclusion: A considerable proportion of our population was either psychologically stressed or depressed. Contrary to the literature, our study suggests that depression may not be the risk factor for obesity, but various stressors may cause it. More research is needed to establish the relationship between obesity, depression, and psychological stress.

P33. Diagnostic and Therapeutic Challenges in A Rare Case Florid Cushing's Syndrome due to Ectopic Adrenocorticotropic Hormone Secretion from Bronchial Carcinoid and Empty Sella: A Case Report

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Background: Diagnostic and therapeutic challenges in a rare case of florid Cushing's syndrome due to ectopic adrenocorticotropic hormone secretion from bronchial carcinoid and empty sella.

Case Report: A 72 years old presented with progressive weight gain, proximal muscle weakness, shortness of breath on mild exertion, new onset of diabetes, and persistent hypokalemia. Clinically, she had signs and symptoms of CS Laboratory tests and radiological imaging favored EAS due to possible bronchial carcinoid. Confirmatory tests and surgery could not be done due to multiple acute complications and poor general health. On a multidisciplinary team consensus decision, she was treated with octreotide. She showed excellent sustained response to somatostatin analog octreotide physically and biochemically.

Conclusion: This rare case highlights the challenges of diagnosis and management of EAS in an elderly lady with multiple acute comorbid conditions hindering full investigations from confirming a diagnosis and surgical intervention.

P34. Coexisting Thyroid-Stimulating Hormone Secreting Pituitary Adenoma and Graves' Disease—A Case Report

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Background: Grave's disease (GD) is the commonest cause of thyrotoxicosis. Thyroid-stimulating hormone (TSH)-producing pituitary adenoma (TSHoma) is a rare cause of thyrotoxicosis and comprises only 0.5 to 3% of all pituitary tumors. The coexistence of these two conditions is extremely rare and challenges diagnosis and management.

Case Report: We present a case of coexisting TSHoma and GD in a patient with a visual field defect who had an inappropriately normal TSH and high free T3 and free T4 levels. A 46-year-old Filipino male presented to the emergency department with a decreased vision for 1 month. He also reported 3 months history of tremors and palpitations. Neurological examination revealed bitemporal hemianopia, a pale left-sided optic disc on fundus examination, and a firm, diffuse, nontender thyroid swelling. Laboratory examination showed a normal complete blood count, renal function tests, and liver function tests. Serum TSH was 3.35 mIU/L with high free T3 and free T4 levels (19.7 pmol/L and FT4 68.9 pmol/L, respectively). The serum TSH receptor antibody was positive (11.5 mIU/L). Serum sex hormone binding globulin was high (126 nmol/L). The rest of the pituitary hormonal profile was normal. A pituitary magnetic resonance imaging (MRI) showed a $3 \times 2.7 \times 3$ cm extending to the suprasellar cistern, causing compression on the optic chiasm. A nuclear scan of the thyroid gland (Tc 99m pertechnetate) demonstrated features suggestive of GD (diffusely increased homogeneous uptake with total uptake of 36%). Due to high FT4 levels and its

resultant intraoperative risk, the patient was initially managed with subcutaneous octreotide 100 mg twice daily and oral carbimazole 40 mg once daily, followed by transsphenoidal endoscopic resection of pituitary macroadenoma.

Interestingly, the immunohistochemistry was negative for adrenocorticotropic hormone, prolactin, growth hormone, follicle stimulating hormone, TSH, and LH. Due to a high suspicion of TSHoma despite the negative histopathology, further workup to confirm the diagnosis showed a positive α subunit pituitary tumor marker level. An NM Ga68 DOTATATE whole-body PET CT showed increased uptake in the pituitary adenoma showing the presence of functional tissue in the pituitary gland. A follow-up pituitary MRI showed a stable size of the residual tumor measuring but persistent optic chiasm compression. The patient noticed a significant improvement in right-eye vision and mild improvement in left-eye vision. He was not willing to undergo repeat surgery. Therefore, now he is on octreotide intramuscular injection of 20 mg every 4 weeks and carbimazole 20 mg once daily with the latest TSH in the normal range (3.27 mIU/L) and FT4 of 8.5 pmol/L for which dose of carbimazole has been reduced to 10 mg once daily.

Conclusion: The treatment of concomitant TSHoma and GD is complicated as the management strategies for both disorders differ. Nevertheless, it is essential to identify this rare coincidence when evaluating patients with hyperthyroidism. The use of antithyroid drugs in such patients can paradoxically worsen TSHoma.

P35. Assessment of Quality of Life in Newly Diagnosed Hyperthyroid Patients with The Thyroid-Specific Patient-Reported Outcome Scale

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Background: Impaired quality of life in hyperthyroidism is a reality. The Thyroid-Specific Patient-Reported Outcome (ThyPRO) is a tool to evaluate the quality of life (QoL) of patients with benign thyroid pathology, whether functional or structural.

Methods: We conducted a prospective and descriptive study over 10 months, from January 01, 2017, to October 01, 2017, at the internal medicine department of Pikine. We included all patients with recent peripheral hyperthyroidism. A data collection form on the ThyPRO scale was completed at baseline, after 6 weeks of treatment, and at 6 months of treatment. It is a translation of the English version of the ThyPRO-39 English version of 2015.

Result: Thirty newly diagnosed hyperthyroid patients were collected. The mean age was 36.3 years. All ThyPRO scales were affected at the onset of the disease.

Regarding physical symptoms, the sensitivity was very noticeable in thyrotoxicosis signs, ocular signs, and goiter manifestations. Fatigue was felt in most patients. As far as mental health is concerned, a psychological impact was constantly found. The deterioration of the daily life, social life, and sexual life of the patients was observed in our cohort, constituting a brake in the appreciation of the quality of life. After 6 weeks and 6 months of follow-up, all 13 ThyPRO scales were improved. The physical symptom scales were the most sensitive. Signs of hyperthyroidism, ocular signs, and goiter symptoms were improved. Besides physical symptoms, fatigue and mental health were also improved. A good perception of fatigue was experienced, with vitality becoming prevalent.

Conclusion: The ThyPRO has the advantage of being specific to benign thyroid disease and self-administered by the patient. It allows a global study of the QoL in hypothyroidism.

P36. The 2021 Survey of Management of Hypothyroidism in the Middle East and Africa

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Background: Hypothyroidism is a common endocrine disorder that many physicians may manage. Patients with uncorrected hypothyroidism suffer significant morbidity. The clinical management pattern of hypothyroidism varies in different parts of the world. Surveys of physicians' perceptions and practices may indirectly measure the quality of care. Therefore, we conducted this survey to revisit the clinical practice patterns relating to managing primary hypothyroidism in adults in the Middle East and Africa in 2021.

Methods: A convenience sample of physicians practicing in the Middle East and Africa (MEA) in relevant disciplines were invited to take a web-based survey consisting of validated multiple-choice questions dealing with the investigation and treatment of an index case of overt primary hypothyroidism in general and in three special situations.

Result: A total of 229 responses were eligible for inclusion in the analysis. Most were endocrinologists and internal medicine specialists in the Arabian Gulf region (58.5%). Most respondents were adult endocrinologists (39.3%), 37 primary care physicians (16.2%), 34 internists (14.8%), and 23 internists with an interest in endocrinology (10.0%). An index case with overt hypothyroidism was treated by 94.8% of respondents. They would use L-T4 alone by 93.9% of respondents; 2.8% would use a combination of L-T4 and liothyronine (L-T3) therapy. The rate of replacement was gradual (64.0%), an empiric dose adjusted to achieve target levels (14.0%), or a calculated full replacement dose (19.7%). The commonest starting dose was 50 µg daily (47.2%), with an L-T4 dose increment of 25 µg by 56.2% of respondents. Serum thyroid-stimulating hormone (TSH) was used by 94.9% and Free T4 by 47.0% of respondents for follow-up. Targeting TSH between 2.0 and 2.9 mU/L was favored in the index case of overt hypothyroidism by 41.6%. However, a higher target was recommended for an 85-year-old person and a tendency for a lower target for a 25-year-old patient. After achieving a stable replacement dose, 37.9 and 44.9% of respondents repeated laboratories every 3 and 6 months, respectively. Persistent hypothyroid symptoms after achieving a target TSH prompted testing for other causes by 80.3% of respondents, a change to L-T4 plus L-T3 therapy by 8.7%, and an increase in the thyroid hormone dose by 6.7%. Evaluation of persistent symptoms included measurements of complete blood count (74.9%), complete metabolic panel (66.2%), morning cortisol (61.4%), vitamin B12 levels (51.7%), and serum T3 levels (25.6%). In the case of subclinical disease (TSH 7.8 mU/L) the patient would be further investigated by anti-TPO antibodies (77.8%), thyroid ultrasound, lipids panel, anti-TG antibodies, Free T3 and total T3 by (58.8%, 52.1%, 45.9%, 36.1%, and 12.4% respectively). However, it would be treated without seeking further justification by only 10.0% of respondents in

the presence of positive thyroid peroxidase antibodies (57.0%), hypothyroid symptoms (57.0%), high low-density lipoprotein (47.7%), a goiter (39.4%), known atherosclerotic disease (38.9%), or any traditional risk factor for coronary artery disease (32.6%). The TSH target for a newly pregnant patient was widely scattered, with the majority (27.6% of respondents) choosing 2.0 to 2.4 mU/L and 15.3% preferring a TSH target of 1.5 to 1.9 mU/L. Thyroid hormone levels were checked every 4 weeks during pregnancy by 62.9% and every 8 weeks by an additional 17.6% of respondents. A pregnant hypothyroid patient with a TSH of 0.5 mU/L received an immediate L-T4 dose increase (33.0% of respondents) whereas 47.4% of respondents continued the current dose. Monitoring was done after 4 to 8 weeks (63.6 and 22.2%).

Conclusion: The survey revealed (1) a nearly exclusive preference for L-T4 alone for therapy, (2) the use of age-specific TSH targets for replacement therapy, (3) complacent and variable attention to TSH targets in the pregnant and prepregnant women, and (4) a highly variable approach to both the rate and means of restoring euthyroid status for overt disease. The finding is similar to the 2015 survey. More concerted efforts are needed to address these shortcomings.

P37. Management of Hyperthyroidism in Pregnancy: The 2022 Middle East and North Africa Survey

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Background: Optimal management of maternal hyperthyroidism is important for positive pregnancy outcomes. International guidelines for good clinical practice are available. This survey aimed to investigate to what extent the clinical practice relating to the management of hyperthyroidism during pregnancy in the Middle East and North Africa (MENA) region is uniform and consistent with international guidelines.

Methods: We emailed an online validated previously published questionnaire survey based on clinical case scenarios to a convenience sample of MENA physicians. We analyzed 100 responses from physicians who confirmed being involved in managing thyroid disease during pregnancy. In total, 76% of respondents were from the Arabian Gulf, 67% were adult endocrinologists, and 83% were senior doctors (consultants/attending).

Result: Most respondents (74.4%) reported that endocrinologists were primarily responsible for managing Graves' disease (GD) in pregnancy, and 17.4% stated that a joint clinic between endocrinologists and obstetricians exists. For a 26-year-old woman with newly diagnosed GD and wishing for pregnancy, 81.4% of the responders would initiate antithyroid drugs (ATDs).

In comparison, 13.0% would recommend definitive treatment with radioiodine or surgery. In the case of a 34-year-old woman with relapsed GD before pregnancy, 86.1% preferred definitive treatment. For a 24-year-old woman newly diagnosed with GD during pregnancy, 44.7% would treat propylthiouracil, 1.2% with methimazole, and 52.9% with propylthiouracil initially and switch to methimazole after the first trimester. In the case of a 24-year-old woman at 8 weeks of pregnancy who presented with severe nausea and vomiting, weight loss, and palpitation, thyroid function tests were suggestive of gestational thyrotoxicosis and less than two-thirds of respondents (62.8%) would follow up the patient without treatment. Responders used several combinations of tests to monitor the dose of ATDs (thyroid-stimulating hormone [TSH]: 82.1%; free T4 84.5%; total T4: 26.2%; free T3: 36.9%; total T3: 13.1%). Also, the thyroid test results they targeted were inconsistent: [TSH and FT4 (or TT4) in the normal range (25.6%), low TSH and FT4 (or TT4) in the normal range (10.5%), low TSH and FT4 (or TT4) in the upper end of the normal range (57.0%), low TSH, independent of FT4 (or TT4) levels (2.3%)]. Over three-quarters of the respondents (77.4%) would give ATDs without stopping lactation to a lactating woman with GD. In a pregnant woman with GDGD treated with ATDs, TSH receptor antibodies would be checked in the first trimester and, if positive, repeated in the third trimester by 43.5% of respondents. Less respondents (33.7%) would practice in the same manner in a euthyroid pregnant woman previously treated with radioiodine or total thyroidectomy for GDGD. Indeed, 41.9% confirmed checking TSH receptor antibodies in the latter setting. Finally, for a euthyroid 30-year-old pregnant with a huge bilateral non-malignant goiter and sense of tightness around her neck, most respondents were split between regular follow-up during pregnancy with ultrasound (43.0%) and surgery at the end of the second trimester (41.9%).

Conclusion: A wide variation in the clinical practices surrounding managing hyperthyroid pregnant women in the MENA exists, particularly in recognition of gestational thyrotoxicosis, choice of medications, choice of monitoring tests, and targets.

P38. Infringement to Postnatal Follow-Up in Hypothyroid Pregnant Women

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Background: Hypothyroidism in pregnancy is not uncommon. Lack of maternal awareness regarding hypothyroidism and its effects impedes their compliance with the treatment and follow-up. Untreated hypothyroidism may be associated with miscarriage, preterm birth, birth weight disorders, intrauterine fetal death, preeclampsia, postpartum hemorrhage, abruption placenta, and anemia. On the contrary, postpartum thyroiditis is noted in 5 to 17%, and in women with hyroid peroxidase antibodies positive, it may be as high as 42.31%. The diverse nationalities of patients in Qatar mandate the need to investigate hypothyroidism and its complications associated with pregnancy. This will be beneficial in reducing maternal and fetal morbidity by addressing them as high-risk pregnancies and offering these patients early booking in the clinic. So, a retrospective trial was conducted to assess the fetal outcomes in hypothyroid pregnant women, and their postpartum compliance was assessed.

Methods: The study was conducted as a retrospective chart review at Al Wakra Hospital Qatar. The study was approved by Medical Research Committee in 2019. Inpatient records of all women delivered from Jan 2017 to May 2018 were reviewed. Four hundred patients were by simple random sampling. The study population was divided into two groups: Group A: antenatal patients with hypothyroidism, and Group B: antenatal patients without hypothyroidism. Comparisons of quantitative data between the two groups were performed by applying an unpaired *t*-test. Associations between two or more qualitative variables were assessed using the chi-square ($\mathbf{x^2}$) test.

Result: In total, 25.56, 22.78, and 16.67% of women were diagnosed in the first, second, and third trimesters, respectively. The prevalence of preterm birth was 6.11 and 4% (odds ratio [OR]: 1.56, 95% confidence interval [CI]: 0.613–

3.974) in groups A and B, respectively. Small for dates babies in groups A and B were 6.67 and 3.00% (OR: 2.309, 95% CI: 0.848–6.287). Low APGAR score was noted in 7.14% in group A, and 3.09% (OR 2.3095, 95% CI: 0.848–6.287) in group B. In total, 12.78 and 5% (OR 2.783, 95% CI: 1.286–6.023) babies had neonatal intensive care unit admissions in group A and B, respectively. 1.11% of women, while none in the control group, had IUFD. Only 56.11% of women came for postnatal follow-up despite being instructed. Forty-six percent stopped the treatment within 1 year.

Conclusion: Hypothyroidism in pregnancy has adverse effects on fetal outcomes, emphasizing the importance of routine antenatal thyroid screening and postnatal follow-up for the proper management of the pregnancy and safe delivery. Educating mothers regarding the adverse outcomes of noncompliance may aid in adherence to the treatment and follow-up.

P39. High Doses of Levothyroxine are Required in Managing Hypothyroidism in Congenital Nephrotic Syndrome

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Background: Thyroid hormone profile is variable among patients with nephrotic syndrome. Hypothyroidism has been reported in patients with recurrent and congenital nephrotic syndrome. It is nonautoimmune hypothyroidism caused by glomerular pathology leading to the urinary loss of thyroid hormone, thyroid binding protein, and iodine. Children with Finnish-type congenital nephrotic syndrome with NPHS1 gene mutation are prone to early-onset heavy proteinuria.

Case Report: A 23-month-old male toddler initially presented to the emergency department at 7 weeks of age with abdominal distension and scrotal swelling. A diagnosis of congenital nephrotic syndrome was made and confirmed with molecular genetic testing that revealed NPHS1 gene mutation, known to cause the Finnish-type of nephrotic syndrome. The screening for thyroid function at presentation showed very high-thyroid-stimulating hormone (140 mIU/L, reference range 0.73–8.35 mIU/L) and low free T4 (9.2 pmol/L, reference range 11.9–25.6 pmol/L) and showed that he has negative newborn screening for congenital hypothyroidism. Levothyroxine was started with a dose of 50 mcg once daily. His severe proteinuria required frequent albumin infusion at home; it was daily, then reduced to alternative days. His thyroid hormone replacement therapy requirement increased gradually, as indicated. His current dose of levothyroxine was 125 mcg once daily (12.5 mcg/kg), which was considered a high dose for this age.

Conclusion: This case report emphasizes the importance of screening for hypothyroidism in patients with congenital nephrotic syndrome, which would help in early diagnosis and intervention. It also demonstrates that congenital nephrotic syndrome patients have a higher requirement of thyroid hormone supplementation to normalize the thyroid function.

P40. Monoclonal Antibodies for the Treatment of Graves Ophthalmopathy: A Systematic Review and Meta-analysis

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Background: The traditional standard of care for Graves ophthalmopathy (GO) is glucocorticoid therapy, which is associated with many long-term side effects. This systematic review and meta-analysis aimed to compare the traditional therapy to novel monoclonal antibodies (e.g., rituximab, teprotumumab, and tocilizumab).

Methods: We searched the Medline, Embase, and Cochrane Central Register of Controlled Trials databases. We included randomized controlled trials (RCTs) that compared monoclonal antibodies (e.g., rituximab, teprotumumab, and tocilizumab) with glucocorticoids or placebo in patients with GO. We evaluated the clinical activity score (CAS), proptosis, subjective diplopia using the Gorman score, quality of life (QoL), adverse events, change in lid fissure, no signs or symptoms; only signs; soft tissue; proptosis; extraocular muscle; cornea; sight loss (NOSPECS) score, and thyroid-stimulating hormone receptor antibodies (TRAb) levels. The odds ratio (OR) was used to represent dichotomous outcomes. The continuous outcomes were represented as standardized mean difference (SMD). Data were pooled using the inverse variance weighting method. The risk of bias was assessed using the revised Cochrane risk of bias tool for randomized trials.

Result: Six RCTs ($n = 571$) were deemed eligible. The different monoclonal antibodies were significantly more efficacious than glucocorticoid/placebo in terms of reduction in CAS (SMD = −1.44, 95% confidence interval [CI]: −1.91–0.97, $p < 0.00001$, $I^2 = 74\%$), change in proptosis (SMD = −4.96, 95% CI: −8.02–1.89, $p = 0.002$, $I^2 = 99\%$), QoL (SMD = 2.64, 95% CI: 0.50–4.79, $p = 0.02$, I2 = 97%), and Gorman score for diplopia (OR = 3.42, 95% CI: 1.62–7.22, $p = 0.001$, $I^2 = 8\%$). However, monoclonal antibodies have shown higher rates of adverse events (OR = 2.91, 95% CI 1.12–7.56; $p = 0.03$, $I^2 = 62\%$). No significant difference was found concerning lid fissure, NOSPECS, and TRAb levels.

Conclusion: This meta-analysis demonstrated that monoclonal antibodies were associated with more favorable clinical outcomes than standard steroid therapy or placebo, especially regarding CAS, change in proptosis, diplopia, and QoL, with teprotumumab being superior.

P41. Diagnosing Celiac Disease by Two Distinct Nail Signs in Patients with Hashimoto Thyroiditis: Case Series

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Background: Celiac disease is associated with other autoimmune disorders, including autoimmune

hypothyroidism. Celiac disease should be considered in those with resistant hypothyroidism as it may affect levothyroxine absorption. The author reports two cases of resistant hypothyroidism secondary to celiac disease. Clinical clues for the diagnosis were elicited by examination of the hands, which showed two distinct signs. The first case was a 23-year-old male who presented with resistant hypothyroidism and was found to have finger clubbing that led to the diagnosis of celiac disease. The second case was a 24-year-old female who presented with resistant hypothyroidism and was found to have koilonychia, leading to a celiac disease diagnosis. Both cases' resistant hypothyroidism was resolved after a gluten-free diet.

Case Report: The first was a 23-year-old male who presented with resistant hypothyroidism with a thyroid-stimulating hormone (TSH) of 33 mIU/L despite being on L-thyroxine 125 mcg daily. The patient was suffering from fatigue, cold intolerance, and excessive sleepiness. On the first visit, body weight was 67 kg and body mass index (BMI) was 21.6 kg/m^2. On examination, there was bradycardia, goiter, delayed relaxation phase of tendon reflexes, and clubbing of the fingers (Fig. 1). All other causes of clubbing were excluded. Antithyroid peroxidase antibodies (Abs) were 109 IU/mL, and antitissue transglutaminase (tTG) Abs were 32 U/mL. Duodenal biopsy showed Marsh IIIb. L-thyroxine dose was increased to 200 mg daily, and the patient was instructed to follow a strict gluten-free diet. Eight weeks later, his symptoms resolved, his body weight was reduced to 64 kg, and his TSH was 11.5 mIU/L. The l-thyroxine dose was increased to 225 mg. After 1 year of follow-up, TSH was 0.3 mIU/L, and the L-thyroxine dose was reduced to 200 mg weekly and 150 mcg on weekends. The second was a 24-year-old female who was a known case of Hashimoto's thyroiditis and presented with clinical features of hypothyroidism despite being on 50 mcg of L-thyroxine. Her initial body weight was 77 kg, and her BMI was 29.3 kg/m^2. Koilonychia was elicited by examination, which raised the suspicion of iron deficiency anemia and hence celiac disease. TSH was found to be 10.1 mIU/L, iron 11.2 mcg/dL, and ferritin three mcg/dL. Duodenal biopsy revealed Marsh IIIb. The l-thyroxine dose was increased to 75 mcg daily. She was given an intravenous iron infusion and was advised to follow a gluten-free diet. On a subsequent visit 6 months later, her body weight was reduced to 74 kg, TSH 1.5 mIU/L, and tTG Abs 3.2 U/mL.

Conclusion: Celiac disease is associated with autoimmune thyroid disease and should be considered in the workup for resistant hypothyroidism. Celiac disease is one of the causes of finger clubbing and can be associated with koilonychia due to iron deficiency anemia.

P42. Management of Hypothyroidism in Pregnancy: Results of the 2022 Survey of Physicians from the Middle East and North Africa

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Background: Maternal hypothyroidism in pregnancy is associated with several adverse outcomes. Although guidelines for managing thyroid diseases in pregnancy have been published, their impact on routine clinical practice is unknown. Therefore, we have surveyed a convenience sample of physicians practising in the Middle East and North Africa (MENA) to study current practices relating to managing hypothyroidism in pregnancy. Methods: A validated online questionnaire survey based on clinical case scenarios was emailed to a convenience sample of MENA physicians. We analysed 100 responses from physicians who confirmed being regularly involved in managing thyroid disease during pregnancy. 76% of respondents were from the Arabian Gulf, 67% were adult endocrinologists, and 83% were senior doctors (consultants).

Results: For a pregnant woman with newly diagnosed overt hypothyroidism, 40% of responders initiated a full dose of l-thyroxine (l-T(4)), 32% started for a few days on a double dose (e.g. 200 mcg daily), then a dose based on pregnancy-adapted body-weight, and 24% start on a dose based on pregnancy-adapted body weight. For a woman with hypothyroidism planning pregnancy, 32.9% recommended increasing the dose of l-T(4) as soon as pregnancy is confirmed, whilst 47.4% favoured testing thyroid function before adjusting the dose. For a hypothyroidism woman euthyroid on L-thyroxine replacement undergoing ovarian hyperstimulation, 70.7% checked thyroid function tests after hyperstimulation and increase the dose of L-thyroxine if necessary, but 25.3% increased the dose of L-thyroxine by 30-50% as soon as pregnancy is confirmed. Responders used diverse combinations of tests to monitor the dose of thyroxine (TSH: 94.67%; Free T4: 70.7%; Total T4: 20%). The target of thyroid function tests that responders aimed to achieve with l-T(4) was also inconsistent, with 61.3% of respondents recommending TSH $<$2.5 mIU/l in the first trimester and $<$3 mIU/l in the second and third trimester, however, 33.3% of respondents required TSH and FT4 within the trimester-specific reference range for their laboratory. Concerning the respondents' perceptions of the risk(s) from overt hypothyroidism that is diagnosed and treated adequately in the late first trimester, over half (53.3%) thought of subtle impairment in neuropsychological development in the offspring, but without clinically significant consequences, 28.0% suggested clinically significant neuropsychological impairment in the offspring and 14.7% thought there are no consequences. 82.2% would not advise a patient diagnosed with overt hypothyroidism in the late first trimester to consider abortion. 43.7% of responders or their institutions screened all pregnant women for thyroid dysfunction, 40.9% performed targeted screening of only the high-risk group, whilst 15.5% did not carry out systemic screening. When adopted, the timing of the screening, tests used, and criteria for selective screening were variable criteria for starting treatment and monitoring.

Conclusions: There is wide variation in the attitudes and clinical practice relating to treating and screening hypothyroidism during pregnancy in the MENA region.

P43. The Effect of Different Levothyroxine Timing on Thyroid Function in Patients with Hypothyroidism During Ramadan

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Background: The timing of levothyroxine administration is of significant importance. Typically, patients with hypothyroidism need to take their levothyroxine dose on an empty stomach to avoid the influence of food and medications that alter L-T4 absorption. It is common to advise such patients to take their levothyroxine when fasting either 30 minutes before Iftar or 30 minutes before Suhoor, proceeded by 3 hours of fasting. However, studies that compare the two methods still need to be included.

Methods: This is a prospective cohort study during the holy month of Ramadan in 2022. Eighty patients with hypothyroidism living in Riyadh were screened, forty-two signed

the consent, and thirty-nine patients completed the study. All hypothyroidism participants were 18 years or older, known to be compliant with their levothyroxine, on no interfering medications, and had no malabsorptive diseases. Furthermore, all participants completed a quality-of-life questionnaire at the beginning and end of the study. In addition, they completed satisfaction and difficulty rates questionnaires at the end of the study. SPSS was used for statistical analysis, and data are presented as mean ± standard deviation.

Result: Patients were randomized into two groups: pre-Iftar group 1 ($N = 20$), females 75%, and mean age 45.9 years; and pre-Suhoor group 2 ($N = 19$), females 89.5%, and mean age 44.1 years. At the start of the study, the median TSH level was 0.79 and 1.06 in groups 1 and 2, (p-value 0.822), and the mean free T4 levels were 14.74 ± 2.4 in group 1 and 14.53 ± 2.78 in group 2 (p-value 0.809), while T3 levels were 3.36 ± 0.37 in group 1 and 3.35 ± 0.56 in group 2 (p-value 0.964). The mean follow-up durations, compliance rate, vitamin D, and thyroid antibody levels were similar in both groups. At the end of the study, we measured the difference in TSH, free T4, and T3 levels between the start and the end of the study duration in both groups. It showed the change in the median TSH level in a pre-Iftar group by 0.66 (2.99–[−0.67]) and 0.03 (0.99–[−0.81]) in a pre-Suhoor group (p-value of 0.092). The change in mean free T4 level was -1.23 ± 2.66 in group 1 and 0.01 ± 3.12 in group 2 (p-value 0.193); the change in T3 level was -0.18 ± 0.78 in group 1 and 0.13 ± 0.59 in group 2 with a p-value of 0.168. The satisfaction and difficulty rates and quality of life questionnaire were statistically similar in both groups, with no statistical difference between the two groups.

Conclusion: Our study revealed that there is no significant effect on thyroid function by levothyroxine ingestion timings during fasting in Ramadan. Additionally, the satisfaction and difficulty rates were similar in pre-Iftar and pre-Suhoor timings. However, larger studies are needed to confirm our findings further.

P44. Thyroid Disorders and Iodine Intake in Adult Females Attending Diabetes and Endocrine Center at Buraidah in Saudi Arabia

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Background: Iodine is an essential component in the diet because it cannot be stored in the human body. Several beverages and food contain iodine, either naturally (seafood) or as an additive (iodized salt)—the recommendation for dietary iodine intake is 150 g/d in adults. The objective of this study is to determine the dietary iodine intake differences among thyroid disorders of adult females attending the Diabetes and Endocrine Center at Buraidah in Saudi Arabia.

Methods: This was a cross-sectional study. This study had 331 female participants diagnosed with thyroid disorders (18–60 years old) chosen randomly from Diabetes and Endocrine Center at Buraidah. A demographic questionnaire and I-FFQ were distributed online among the sample. All data were entered and analyzed through SPSS program version 26. The iodine intake is distributed into poor (<99 µg/day), adequate (100–199 µg/day), above requirements (200–299 µg/day), and excessive (>300 µg/day) groups.

Result: The mean age was 40.79 years. The mean total iodine consumption was 217 µg/d. Iodized salt was the primary source of iodine intake of 100.32Â µg/d. The mean total iodine intake among thyroid disorders was 211 µg/d for hypothyroidism, 245 µg/d for hyperthyroidism, 270 µg/d for thyroid nodules, and 195 µg/d for thyroid tumors. Total iodine intake had no significant difference among thyroid disorders ($p < 0.05$).

Conclusion: The population should be educated about the adverse health effects of increased daily iodine intake exceeding the daily iodine requirement (100–199 µg/d). Future cohort studies should be conducted to further understand the effects of different iodine intake on possible alterations in thyroid function during different life stages.

P45. Ultrasonographic Predictors of Thyroid Cancer in Bethesda III and IV Thyroid Nodules

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Background: Thyroid nodules with Bethesda III and IV cytology continue to be problematic in their management. Although molecular testing may assist decision-making, it is expensive, not widely available, and not without pitfalls. This study aims to assess whether certain thyroid ultrasonographic features may predict the risk of thyroid cancer in patients with Bethesda III and IV thyroid nodules so they can be used as additional decision-making tools to complement the cytopathological results in deciding on diagnostic thyroidectomy.

Methods: We retrospectively evaluated the ultrasonographic features of thyroid nodules in which the fine-needle aspiration cytology (FNAC) was reported to be Bethesda III or IV and underwent thyroidectomy. We used the final histopathological examination of the surgical specimens as the gold standard test. Furthermore, we analyzed the preoperative ultrasonographic features for their malignancy prediction and diagnostic accuracy.

Result: Out of 278 patients with Bethesda III and IV FNAC, 111 (39.9%) were thyroid cancer, and 167 (59.9%) were benign. The malignancy rate was higher in Bethesda IV (28/50, 56%) than in Bethesda III (83/228, 36.4%), $p = 0.016$. In a univariate analysis, hypoechogenicity (55.6 in malignant vs. 35.3% in benign, $p = 0.006$) and calcifications (54.5 vs. 35.4%, $p = 0.008$) significantly differed between benign and malignant pathology groups. In contrast, the size of the dominant nodule, number of nodules, irregular borders, taller than wider, and suspicious lymph nodes were comparable between the two groups. These two ultrasonographic features (hypoechogenicity and calcifications) remained significantly associated with the risk of malignancy in multivariate logistic regression analysis, hypoechogenicity ($p = 0.014$, odds ratio 2.1, 95% CI: 1.–3.7), and calcifications ($p = 0.019$, odds ratio 1.98, 95% CI: 1.12–3.50). The sensitivity, specificity, positive predictive value, negative predictive value, and accuracy for hypoechogenicity were 31.5, 83, 55.6, 64.7, and 62.6% and for calcification were 32.4, 82, 54.5, 67.8, and 62%, respectively.

Conclusion: Hypoechogenicity and calcifications are strong predictors of thyroid cancer in Bethesda III and IV thyroid nodules and are associated with a twofold increased risk of malignancy.

P46. Frequent Scanning by FreeStyle Libre and Its Impact on Glycemic Control

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Background: Evidence showed that glucose-sensing devices are effective in achieving better glycemic control and decreasing glucose variability in children with type 1 diabetes mellitus (T1DM) on insulin therapy. It improves the patient's quality of life. Checking glucose levels as frequently as 8 to 14 times a day for people using the FreeStyle Libre system (FSL) would result in a better insight into the glucose status, potentially reflecting better glycemic control. This study explores the relationship between the frequent use of the FSL system and the percentage of achieving glucose within the target in our patients with T1DM.

Methods: In a cross-sectional study using the Libreview database, we reviewed 163 profiles of patients using FreeStyle Libre who received their care at the Pediatric Endocrine and Diabetes Unit at Sultan Qaboos University Hospital. The extracted data covered the last 2 weeks from each profile between 2021 and 2022. We focused on the frequency of scanning, average blood glucose, and the average percentage of time in range (TIR). Data were explored in Microsoft Excel, where descriptive and regression analyses were performed.

Result: In total, 163 profiles were detected on our LibreView database for children and young people living with T1DM. The median age of this cohort of patients was 11.1 years, mean $\pm$ standard deviation (SD) was 11.1 ± 3 years. Only 12% (19/163) achieved the recommended percentage of the target in range (TIR $>$ 70%), aged 7.5 ± 0.8 years. Furthermore, we found that the average scanning of the studied patients was eight times a day, and their average glucose was 11.3 mmol/L. Our study compared the groups who scanned more than eight times a day versus those who scanned less. We found that 94 patients checked less than eight times a day had a mean blood glucose of 11 mmol/L with a TIR of 39%, whereas the other 66 patients who were scanned eight times and more a day had average glucose of 10 mmol/L with a TIR of 48%. Stating that no statistical significance was found in a regression analysis between the frequency of scanning and blood glucose values or TIR ($p = 0.87$ and $p = 0.85$, respectively), which perhaps indicated that frequent scanning alone is not enough to result in better achievements. Other factors such as acting on the glucose readings, reasonable daily scanning, patients' age, lifestyle, and timing of blood sugar measurements may play a role.

Conclusion: Although evidence demonstrates the effectiveness of using FSL to reach better glycemic control. However, in our patients, no statistical significance was found in a regression analysis between the frequency of scanning and blood glucose values. Other factors must be studied, and further education on proper action-taking and recommended scanning frequency must be advocated.

P47. The Global Research Productivity on Medullary Thyroid Carcinoma: A Scopus-Based Bibliometric Analysis

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Background and Objectives: Medullary thyroid carcinoma (MTC) is a rare tumor that originates from thyroid C cells and accounts for 2 to 4% of all malignant thyroid neoplasms. MTC may occur sporadically or be inherited as part of the MEN 2 syndrome. To the best of our knowledge, there has yet to be any quantification of the global research production about MTC. Therefore, this study aimed to quantify the global literature productivity on MTC.

Materials and methods: The title, abstract, and keywords in the Scopus database were searched for "medullary thyroid carcinoma" up to December 31, 2021. The standard bibliometric methodology analyzed articles, and the VOS-viewer software was used to explore relations and construct bibliometric diagrams.

Results: The total number of retrieved articles in the study periods was 5,098, of which 1,376 were available for open access; 4,146 were in English. The number of published papers showed steady productivity over the last 10 years ranging from 146 to 184. However, the number of articles peaked at 204 in 2021. The majority (4,122) were research articles or surveys, whereas 709 were either reviews, editorials, or books. The most prolific authors (with over 50 articles) were F Raue with 122 articles and H Dralle with 111, followed by RF Gagel (75), M Schlumberger (67), SA Wells (66), K Frank-Raue (65), SB Baylin (54), A Miyauchi (52) and C Eng (51). The top five journals involved were the Journal of Clinical Endocrinology and Metabolism (181), Thyroid (136), Clinical Endocrinology (86), Cancer (73), and Endocrine Pathology (63). U.S.-based authors and affiliated institutions were dominant, with 1,321 articles, followed by Italy (573), Germany (555), France (441), and Japan (333). The most actively involved institutions were the University of Texas MD Anderson Cancer Center with 142 articles, followed by INSERM (97), Institut de Cancerologie Gustave Roussy (97), Washington University School of Medicine in St. Louis (96), and Martin-Universität Halle-Wittenberg (93). The top five funding sponsors were the U.S.-National Cancer Institute (187), the U.S.-National Institutes of Health (160), U.S. Department of Health and Human Services (75), Associazione Italiana per la Ricerca sul Cancro (53), and the U.S.-National Institute of Diabetes and Digestive and Kidney Diseases (47). The top three most cited five articles received 1,717, 1,158, and 1,133 citations, respectively. The top 10 most cited articles included guidelines (1), reviews (1), clinical trials (3), and other research articles (5). The most frequent subject-based keywords were thyroid medullary carcinoma in various versions (3,199, 1,215, 1,211, 616), thyroid neoplasms (2,988), calcitonin (1,936, 624), thyroid tumor (1,359), thyroidectomy (1,344), gene mutation (845), pheochromocytoma (838), adolescent (794), protein RET (749), genetics (730), proto-oncogene proteins C-ret (726), and multiple endocrine neoplasias (670).

Conclusions: This is the first bibliometric study on medullary thyroid carcinoma. It recognizes key opinion leaders, interested institutions, and journals, particularly for young researchers and newcomers to the subject. This may help foster more collaboration and create further networking to help uncover gaps in research activity and define further research directions.

Authors' Contributions

This abstract book was compiled by the scientific committee acting as the guest editors. The GAED mandates that all named authors on submitted abstracts comply with the ICMJE 4 criteria of authorship.

Compliance with Ethical Principles

The abstracts are accepted on the proviso that all human and animal research was conducted according to the appropriate ethical principles, with prior ethical approvals and patient informed consent.

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Conflicts of Interest
None declared.

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