

Diabetes Conference 2017



International Conference on

DIABETES, NUTRITION, METABOLISM & MEDICARE

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Poster

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Implementation of preventive interventions for care of patients with type II diabetes at primary care clinics in British Columbia, Canada

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Type II diabetes is a major public health issue with increasing prevalence in British Columbia and in Canada. The importance of life style changes for improving health outcomes in patients with type II diabetes is well known. There is newly emerging evidence suggestive of the reversibility of type II diabetes with the loss of 15% or more of body weight in obese patients. However, implementing these approaches at the primary care level is challenging mainly due to the lack of a local/provincial guideline. This study focused on developing a preventive guideline to be

used at the primary care level in BC for the prevention and/or reversal of type II diabetes at initial stages of disease.

Biography

Golshan Massah completed her Bachelors of Science from the University of British Columbia and is currently in her second year of medical school at the University of British Columbia School of Medicine. She is interested in preventive medicine and the management of chronic diseases in the primary care setting. Following her medical studies she hopes to pursue a residency in family medicine.

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Notes:

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Validity and reliability of a self-report measure of diet in patients with type 2 diabetes

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Purpose: Patients with diabetes and low literacy and numeracy skills have difficulty adhering to dietary recommendations. Practical and effective tools assessing self-management behaviors are needed to help evaluate interventions tailored to the needs of individual patients or population groups. This study examined the psychometric properties of a short 11-item version of the Personal Diabetes Questionnaire scale (PDQ-11) among patients with Type 2 diabetes.

Design Methods: Participants (n=411) completed the PDQ-11 (English or Spanish version), the Summary of Diabetes Self-Care Activities (SDSCA), the Perceived Diabetes Self-Management Scale (PDSMS), and the Adherence to Refills and Medications Scale (ARMS). Statistical analyses were conducted to explore the structure of the PDQ-11, and its internal reliability and validity.

Results: Participants were 64% non-Hispanic whites; 18% non-Hispanic blacks; 24% Hispanics; with mean age, 49.3±9.4 years; mean education of 11.2±3.3 years; mean BMI, 35.8±8.9 kg/m²; and A1C, 9.6%±2.1. Factor analysis of the PDQ-11 revealed four components (items loading >0.40;

cronbach's $\alpha=0.50 - 0.81$): eating behavior problems; use of information for dietary decision making; calorie restriction; and activity and exercise. eating behavior problems and use of information for dietary decision making had the strongest associations with the diet subscales of the SDSCA; general diet ($r_s=-0.29$ and 0.31 , respectively); specific diet ($r_s=-0.20$ and 0.19 , respectively) and were also correlated with the PDSMS and ARMS scores (all $p_s<0.001$). Different PDQ-11 subscales predicted BMI (Calorie Restriction, $\beta = 0.17$, $p<0.01$; and activity and exercise, $\beta=-0.17$, $p<0.01$); diastolic blood pressure (eating behavior problems, $\beta =-0.14$, $p<0.01$) and systolic blood pressure (Eating Behavior Problems, $\beta =-0.17$, $p<0.01$).

Conclusion: The PDQ-11 is a valid measure of dietary behaviors in patients with type 2 diabetes; its use may help to tailor individual nutrition intervention strategies

Biography

Sylvie A. Akohoue is currently working as Adjunct Assistant Professor in Department of Medicine, Division of Gastroenterology in Meharry Medical College, USA.

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Electrophysiological status of sural nerve in type 2 diabetic patients before overt peripheral neuropathy

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Neuropathies in type 2 diabetes mellitus (T2DM) patients are well documented. However, electrophysiological changes in their peripheral nerves, particularly before overt peripheral neuropathy have received much less attention. Hence, we studied electrophysiological status of bilateral sural nerves in T2DM patients who do not show clinical evidence of peripheral neuropathy. We selected 35 male patients with T2DM and 35 age- and sex-matched healthy controls without any clinical evidence of peripheral neuropathy and other infectious, systemic, metabolic, and neuropsychiatric illnesses after informed written consent. Nerve conduction study of bilateral sural nerves of both the groups was performed at lab temperature of $26 \pm 2^\circ\text{C}$ by antidromic method of stimulation. Latency, conduction velocity, amplitude, and duration of sural sensory nerve action potential (SNAP) were measured. In our study, we found reduced amplitudes of bilateral sural SNAP in T2DM patients compared to the controls [left (12.46 ± 3.77) μV vs. (16.42 ± 4.58) μV , $p=0.000$; right (11.96 ± 4.45) μV vs. (16.62 ± 6.20) μV , $p=0.001$] though they were above the normal cut-off value of ≥ 4 μV . Durations of bilateral sural SNAP were prolonged in T2DM patients compared to the controls [left (1.99 ± 0.38) ms vs. (1.67 ± 0.27) ms, $p=0.000$; right ($1.92 \pm$

0.47) ms vs. (1.55 ± 0.33) ms, $p=0.000$]. Reduced amplitude of sural SNAP suggests axonal loss, whereas prolonged sural SNAP duration is seen in polyneuropathies. Hence, we concluded that electrophysiological alterations suggestive of peripheral neuropathy occur in T2DM patients before overt peripheral neuropathy. Early detection of peripheral neuropathy in T2DM patients helps to prevent long-term complications of diabetes mellitus such as foot ulcers and amputations.

Biography

Raju Panta earned professional medical degrees of MBBS and MD in Basic and Clinical Physiology, from the nationally and internationally accredited medical colleges in Nepal. He was awarded with a "Certificate of Expertise in Electrophysiology" after completion of his doctorate thesis during his residency. His thoughtful ideas inspired him to accomplish research work on Diabetes Mellitus, where he studied electrophysiological evidences of peripheral and central neuropathies in type 2 diabetes mellitus patients before they develop features of peripheral neuropathy. Working as a faculty of Physiology at Trinity School of Medicine, St. Vincent and the Grenadines. He has demonstrated excellence in teaching as evidenced by four "SGA awards" in recognition of best professor. His organizational memberships include the American Physiological Society, International Association of Medical Science Educators, Association for Medical Education in Europe, Physiological Society of Nepal, and Nepal Medical Council..

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Nanoparticles prepared from N, N-dimethyl, N-octyl chitosan as the novel approach for oral delivery of insulin: Preparation, statistical optimization and *in vitro* characterization

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The aim of this study is preparation, optimization and *in vitro* characterization of nanoparticles prepared from octyl chitosan as a new strategy for oral insulin delivery. For this study, N, N-dimethyl N-octyl chitosan was synthesized. Nanoparticles containing insulin were prepared using PEC method, and then were statistically optimized using the Box-Behnken response surface methodology. The independent factors were considered to be the insulin concentration, polymer concentration and pH of the polymer solution, while the dependent factors were characterized as the size, zeta potential, PDI and entrapment efficiency. The optimized nanoparticles were morphologically studied using SEM. The cytotoxicity of the nanoparticles on the Caco-2 cell culture was studied using the MTT cytotoxicity assay method, while the permeation of the insulin nanoparticles across the Caco-2 cell monolayer is also determined. Nanoparticles posed appropriate physicochemical properties. The SEM

morphological studies showed spherical to sub-spherical nanoparticles with no sign of aggregation. The *in vitro* release study showed that $95.5 \pm 1.40\%$ of the loaded insulin was released in 400 min. The cytotoxicity studies on the Caco-2 cell culture showed no significant toxicity after 5 h incubation. The permeability studies revealed significant enhancement in the insulin permeability using nanoparticles prepared from octyl chitosan at 240 min ($11.3 \pm 0.78\%$). The obtained data revealed that insulin nanoparticles prepared from N, N-dimethyl, N-octyl chitosan can be considered as the good candidate for oral delivery of insulin compared to nanoparticles prepared from N, N, N-trimethyl chitosan.

Biography

Parham Norouzian is pharmacist student at Hamadan University of Medical Sciences. He has published 2 articles in International journal of biology.

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Cognitive status of different food categories in patients with type 2 diabetes mellitus and its effect on glycosylated hemoglobin

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Objectives: To explore cognitive status of different food categories in patients with type 2 diabetes mellitus (T2DM) and its effect on glycosylated hemoglobin (HbA1c) with T2DM patients.

Methods: Convenient sampling method was adopted. According to the inclusion and exclusion criteria, two hundred forty-nine patients were recruited from 5 hospitals in Jiangsu, Shanghai, Zhejiang and the diabetes clubs in Suzhou from October 2014 to October 2015. General Situation Questionnaire was utilized to obtain demographic data including age, sex, degree of education, et al. and clinical data including smoking, diabetes duration, family history of diabetes, et al. The Diabetes Mellitus Dietary Knowledge Scale (DDKS) was used to acquire cognitive status of different types of foods in T2DM patients. The patients with HbA1c values <6.5% and those with HbA1c values ≥6.5% were considered as the good glycemic control group and the poor glycemic control group, respectively. The factors related to glycemic control were analyzed.

Results: The patients got the highest score in the foods item that have little effect on glycemia (3.55±1.38) and 25% of them completely answered correct. However, the patients obtained the lowest score in the item "Foods rich in healthy fat" (1.60±1.57). Only 1.6% patients completely answered correct. The average DDKS score of the good glycemic control group was 36.02, which was significantly higher than that of

the poor glycemic control group (30.12) (P<0.001). Education level, body mass index (BMI) and clinical treatment were related to HbA1c control (P<0.05). The items of DDKS related to glycemic control included the items Preferentially chosen meat [B=-0.618;<0.01;95%CI (0.374-0.777)], preferentially chosen beans or milk [B=-0.404;P<0.05;95%CI(0.488-0.914)], Preferentially chosen dietary fiber [B=-0.409;P<0.05;95%CI(0.485-0.910)], preferentially chosen nuts [B=-0.690;P<0.001;95%CI(0.357-0.704)] and foods when hungry, not hypoglycemia [B=-0.518;P<0.001;95%CI(0.450-0.789)]. Adjusting demographic data (age, gender and education level) and clinical data (BMI, smoking, DM duration, DM family history, complications, concomitant disease, and clinical treatment), the item preferentially chosen nuts (B=-0.56;P<0.01;95CI = 0.37-0.87) still influenced HgbA1c level. Other factors included education level, BMI and clinical treatment (P<0.05).

Conclusions: T2DM patients had lower cognitive level of fat foods. Cognitive level of nuts of T2DM patients could predict glycemic control. The nursing staff should strengthen healthy education about fat foods, especially, foods rich in healthy fat.

Biography

Ting Liu is currently a PhD student in Nursing School of Soochow University, China.

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Effect of different types of nuts on glycemic control in patients with type 2 diabetes mellitus

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Objective: To explore the effects of different types of nuts on blood glucose, blood lipids, body mass index (BMI) and inflammation in patients with type 2 diabetes mellitus (T2DM).

Methods: This study was a prospective, single blind and randomized controlled trial. Convenient sampling method was adopted. According to the inclusion and exclusion criteria, T2DM patients were recruited from the First Affiliated Hospital of Soochow University and the diabetes clubs in Suzhou from December 2015 to August 2016. Patients were randomly assigned to peanut group (N=15) and almond group (N=17). In peanut group, male and female patients consumed peanut 60g/d and 50g/d, respectively; in almond group, male and female patients consumed almond 55g/d and 45g/d, respectively, for three months. Before the intervention, 1 week was washout period. All patients received scheduled telephone visits (once/week). When patients were recruited, two groups received the education of low carbohydrate diet by one-to-one. Blood glucose, glycosylated hemoglobin (HbA1c), and IL-6 were collected and compared at baseline as well as 3-month.

Results: 1. Effect nuts on fasting plasma glucose (FPG) FPG between first week and third week decreased significantly in almond group and then fluctuated in the level of glucose of third week 2. Effect nuts on postprandial blood glucose During the intervention, the postprandial 2h blood glucose fluctuated in the two groups, and the fluctuation of postprandial 2h blood glucose in peanut group was higher than that of almond group.

Discussion: Two different types of nuts can improve FPG. and consuming almonds can be conducive to stability of long-term blood glucose and improve BMI of T2DM patients. Therefore, it is recommended that obese patients with unstable blood glucose can moderately consume almonds. Peanuts are good for the patients with the poor FPG and high expression of inflammatory factors. These can be used as adjuvant therapy for T2DM patients

Biography

Yan Zou is currently a PhD student in Nursing School of Soochow University, China.

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Accepted Abstracts

Assessing relationship between dietary intakes, antioxidant micronutrients status and risk of cardiovascular diseases among type 2 diabetic outpatients at teaching hospital in Ghana

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Cardiovascular diseases are associated with type 2 diabetes mellitus and concurrently, cause of 68% mortality among type 2 diabetics. Antioxidant micronutrients level can delay or prevent diabetic complications including CVDs. The study aimed to assess relationship between dietary intakes, antioxidant micronutrients status and risk of cardiovascular diseases among type 2 diabetic outpatients. A cross sectional study was conducted. The BMI, waist circumference fasting blood glucose, HbA1c, lipids profile, coronary risk, atherogenic index of plasma, and serum zinc were determined. Sociodemographic data was collected with questionnaires. Dietary intakes of antioxidant micronutrients were assessed using 24-hour dietary recall. Data was analyzed using SPSS version 23. Out of 152 study population, 37 (24.3%) were males and 115 (75.7%) were females. Generally, 74.3% of study subjects were hyperglycemic. The

prevalence of single dyslipidemia (63.8%) and combined dyslipidemia (15.8%) was found among study participants. Furthermore, 35.3% of study participants had high coronary risk and 5.3% had high atherosclerosis risk. The mean intakes of zinc (5.04 ± 2.76 mg/day), vitamin E (5.16 ± 2.60 mg/day) and vitamin C (82.72 ± 38.76 mg/day) were observed low. Adjusting for age and gender; inadequate vitamin E was directly associated with HbA1c, ($r=0.220$, $p=0.033$), TC, ($r=0.260$, $p=0.011$), LDL-C ($r=0.267$, $p=0.009$) and TC/HDL-C ratio, ($r=0.217$, $p=0.036$). Additionally, controlling for age, gender and dietary zinc; serum zinc was inversely associated with HbA1c ($r=-0.227$, $p=0.05$) and FBG, ($r=-0.206$, $p=0.033$). Status of antioxidant micronutrients were low among study participants, and associated with dyslipidemia and hyperglycemia; increasing CVDs risk.

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Diabetes awareness

Agnes George

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I will aim to educate the audience through the provision of information on diabetes. This disease is far too prevalent in our society, and unfortunately there is no cure! What is currently practiced is an attempt to control one's blood sugar with medications which themselves have adverse effects on the body. It is for this reason that I believe that the only effective way to treat diabetes is by its prevention. I will therefore focus on attempts at preventing this disease. Among the various attempts at prevention are (A) healthy lifestyle (b) weight management and (C) physical activity. I hope to make a global difference in individual lives through speaking. Having observed the devastation caused by the disease, affected individuals suffer from head to toe. The brain is affected with increased incidence of Alzheimer and dementia among individuals who suffer with the disease there is an increased incidence of visual disturbances which may lead to blindness. The circulatory disturbances leading

to foot ulcers, the diabetic foot and worst amputations, renal damage, with persons needing dialysis to merely stay alive. There is an increased incidence of heart disease, myocardial infarction and strokes among diabetes. And men there are an increased incidence of impotence among diabetes which has its effects on family life and the man's self-esteem. Every 17 seconds someone in the World is diagnosed with diabetes. Researchers argues more than 371 million people across the globe have diabetes. This figure is predicted to rise over 550 million by 2030. Ladies and gentleman there is an urgent need to address this disease. After this devastating information, the good news is the condition is preventable. So the next time you are tempted to overindulge in the foods we love, remember you may be eating yourself into a disease state for which there is no cure.

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Improvement of glucose tolerance and total lipid profile of diabetic rats treated with *Ficus exasperata* leaf-based diet

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The aim of this study was to investigate the effect of *Ficus exasperata* leaf-based diet on oral glucose tolerance and total lipid profile of type 2 diabetic rats. To induce type 2 diabetes mellitus experimental animals apart from animals in the positive control (PC) group were administered orally with 10% fructose solution ad libitum for 2 weeks and PC received distilled water. After 2 weeks administration of fructose solution, animals were fasted overnight and each of the fructose-fed animals were injected intraperitoneally with a low dose streptozotocin (40 mg/kg body weight). Oral glucose tolerance test (OGTT) was done by loading the animals with 2 g/kg body weight of glucose. Following the oral glucose load, blood was obtained at 0, 30, 60, 90 and 120 minutes from the tail vein of the rat and analysed for glucose using a glucometer. The procedure was done on day 1 before treatment and day 13 of the experiment. Cholesterol, Triglycerides, High and Low Density Lipoproteins were

assayed for using commercial kits. The result of OGTT before treatment showed increase in blood glucose concentration after 30 mins of glucose load. Two hours later, glucose concentration for all the diabetic animals was not restored back to the basal glucose concentration. By the 13th day of treatment result showed that glucose concentration of all the diabetic animals treated returned back to the basal glucose concentration after 2 hours of the glucose load. Result of the total lipid profile showed that upon treatment with *F. exasperata* leaf-based diet, there was a significant ($p < 0.05$) decrease in the concentration of cholesterol, Triglycerides and low density lipoprotein and a significant increase ($p < 0.05$) in HDL concentration. In conclusion, incorporation of 30, 40 and 50 % *F. exasperata* leaf into diet, consumed for 16 days improved glucose tolerance and total lipid profile compared to positive control.

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The impact of the IADPSG guidelines for gestational diabetes mellitus on a secondary hospital population

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Background: In 2015 the Australian criterion for diagnosing gestational diabetes mellitus (GDM) was changed to mirror the internationally applied IADPSG criterion. Research has predicted this would increase the incidence of GDM due to the lower fasting threshold and a new 1-hour diagnostic value.

Aims: To quantify the impact of the IADPSG guideline on the incidence of GDM at a secondary hospital in Australia. It was hypothesised that the incidence of GDM would increase with no associated difference in maternal or foetal outcomes.

Materials and Methods: Only women with well-controlled GDM continue their pregnancy at this Secondary Hospital, with those uncontrolled or requiring insulin referred to a Tertiary Hospital. All births between January-June 2015 (n=899) and 2016 (n=925) were included in the study. Pregnancies with GDM in 2015, under the previous criteria

(n=71) and those in 2016, under the IADPSG criteria (n=56) were identified. Routine clinical data including blood glucose results, maternal and foetal outcomes were analysed.

Results: After applying the IADPSG criteria at RGH, the incidence of GDM decreased from 7.90% to 6.05%, a 23% relative decrease that was not statistically significant. In the same period in 2016 the referring Tertiary Hospital had a significantly higher incidence of 23% ($X^2=116.92$, $p < 0.01$). There was no significant difference in maternal or foetal outcomes under the IADPSG guideline.

Conclusion: In a Secondary Hospital, the IADPSG criterion has not increased the incidence of GDM as expected. Literature on the new incidence of GDM is lacking and more data is required to quantify the effect of the IADPSG guideline in Australia.

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MicroRNA-210 mediates PKC δ -dependent upregulation of JNK to cause cardiac mitochondrial damage and apoptosis following advanced glycation end-products exposureWei-Wen Kuo¹ and Chih-Yang Huang^{1,2}¹China Medical University, Taiwan²Asia University, Taiwan

Background: Hyperglycemia results in the formation of advanced glycation end products (AGEs), which can induce reactive oxygen species (ROS) production leading to diabetic cardiomyopathy. Our previous study showed that AGE induced ROS-dependent apoptosis is mediated via the protein kinase C (PKC) δ -enhanced mitochondrial damage in cardiomyocytes. MicroRNA-210, a regulator of mitogen-activated protein kinase-JNK (JNK), which is a downstream of PKC δ , has been reported to play a role to mediate mitochondrial function. Therefore, we hypothesized that miR-210 mediates PKC δ -dependent upregulation of JNK to cause cardiac mitochondrial damage and apoptosis following AGE exposure.

Methods & Results: Cardiac miR-210 and mitochondria function were down regulated following AGE exposure. Furthermore, JNK was up-regulated and involved in AGE-induced mitochondrial damage. Interestingly, the result of luciferase activity of the miR-210 mimic treatment was

significantly lower than control and was reversed following the inhibitor treatment, indicating JNK is a target of miR210. Moreover, JNK activation induced by AGEs was reduced by the treatment of miR-210 mimic and reversed by the treatment of miR-210 inhibitor, indicating the regulation function of miR-210 for JNK activation following AGE exposure. Additionally, the JNK-dependent mitochondrial dysfunction was reversed following the treatment of miR210 mimic, and miR210 inhibitor showed no effect on JNK-induced mitochondrial dysfunction in AGE-exposed cardiomyocytes.

Conclusion: PKC δ enhanced JNK-dependent mitochondrial damage is mediated through the reduction of miR210 in cardiomyocytes following AGE exposure. Additionally, the JNK-dependent mitochondrial dysfunction was reversed following the treatment of miR210 mimic, and miR210 inhibitor showed no effect on JNK-induced mitochondrial dysfunction in AGE-exposed cardiomyocytes.

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Serum chemerin relationships with body composition, insulin resistance, dyslipidemia and glycemic control in Saudi women

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Background & Objectives: Chemerin is believed to be a mediator for the adipose tissue inflammation that occurs in obesity. The present study compared chemerin levels between healthy and type 2 diabetic women matched for age and body composition. We also aimed to assess the relationship of serum chemerin levels with body composition, insulin resistance, dyslipidemia and glycemic control.

Material and Methods: This observational case control study was conducted at the Departments of Physiology and Medicine, Saud University Riyadh, Saudi Arabia. A total of 100 subjects were recruited, including 51 adult diabetic females, and a control group consisting of 49 healthy females. Finally 80 subjects were selected as per inclusion criteria. In the finally selected group, 45 of were type 2 diabetics and 35 were healthy subjects matched for age, body mass index (BMI) and body composition with age ranging between 30-65 years. Body composition analysis was estimated using bioelectrical impedance analyzer. Fasting venous blood samples were analyzed for glycemic markers, lipids and chemerin. Insulin resistance and sensitivity indices were calculated by HOMA-IR and QUICKI using standard formulas

Results: The two groups were matched for age, BMI, body fat percentage (BF%), basal metabolic rate (BMR), truncal

fat and waist hip ratio (WHR). Serum chemerin levels were higher in diabetics than controls ($p=0.001$). Systolic blood pressure, weight, fat mass and visceral fat were found to be significantly higher in diabetics when compared to controls. Fasting blood glucose (FBG), glycosylated hemoglobin (HbA1c), low density lipoprotein (LDL), triglycerides (TG), insulin and HOMA-IR were significantly higher in diabetics compared to controls. While QUICKI and HDL were significantly lower in diabetics compared to controls. Chemerin levels correlated positively with age ($r=.300$, $p=0.007$), waist hip ratio ($r=0.250$, $p=0.026$), weight ($r=0.270$, $p=0.016$), BMI ($r=0.334$, $p=0.003$), BF% ($r=0.325$, $p=0.003$), fat mass ($r=0.250$, $p=0.026$), visceral fat ($r=0.356$, $p=0.001$) and truncal fat mass and truncal fat %, serum basal insulin levels and HOMA IR, while it correlated inversely with QUICKI. In multiple linear regression analysis age ($r=0.236$, $p=0.023$), BF% ($r=0.265$, $p=0.014$) and basal insulin levels ($r=0.265$, $p=0.014$) were independent predictors of chemerin.

Conclusions: Serum chemerin levels are elevated in patients with type 2 DM compared to healthy control subjects and are positively correlated with adiposity and Insulin resistance in patients with type 2 DM.

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