

ABSTRACTS

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The Global Impact of Diabetes

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In 2003 it was estimated that the global adult prevalence of diabetes was 194 million, with an estimated annual increase of 6 million each year. Diabetes has now overtaken HIV/AIDS as the largest cause of mortality with 3.2 – 4.0 million deaths annually attributable to diabetes or its complications. Many are from cardiovascular complications and most of them are premature deaths when the people concerned are economically contributing to society.

As the number of people with diabetes grows worldwide, the disease takes an ever-increasing proportion of national health care budgets. Health care costs of a person with diabetes are 2-3 times those for people without diabetes. Overall, direct health care costs of diabetes range from 2.5% to 15% annual health care budgets, depending on local diabetes prevalence and the sophistication of the treatment available. The costs of lost production are as great or even greater than direct health care costs. Combining the cost estimates for 25 Latin American countries suggests that costs of lost production may be as much as five times the direct health care cost.

Without primary prevention, the diabetes epidemic will continue to grow. Even worse, diabetes is projected to become one of the world's main disablers and killers within the next twenty-five years. Immediate action is needed to stem the tide of diabetes and to introduce cost-effective treatment strategies to reverse this trend.

Diabetes guidelines and evidence-based medicine

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Traditionally medical care was performed by people trained at universities who subsequently acquired further experience from the practice of themselves and others. However, modern medical care changes very quickly, due to advances in both understanding and technology, faster than the most expert practitioner can keep up. An added problem is that the quality of the evidence supporting both the new knowledge and the new technologies is highly variable, indeed too variable to make it easy to adopt into regular clinical care.

A number of approaches to this problem have been tried. Consensus guidelines take groups of experts and ask them

to contribute their knowledge of both the evidence and their own experience (increasingly the former), to derive an agreed guideline for care. Such guidelines have proved very successful if broadly based. The so-called evidence-based approach uses rigorous assessment criteria which excludes much of the literature except randomized controlled trials, which are assessed on artificial (trial) measures of quality rather than clinical qualities. The effect is to limit new advances, particularly those which require a measure of clinical experience to be used most optimally.

More recently the approach has been to develop evidence-based guidelines. Here the relevant literature is systematically identified and reviewed, but expertise and understanding of the science and clinical applicability is used to put into context. A further important aspect of modern guidelines and technology guidance is that they should have a health economic context. Accordingly it is also now usual to consider cost-effectiveness aspects of guideline recommendations in making them. For further information please visit <http://www.idf.org>

The Median is Not The Only Message: Ways to Evaluate Diabetes Therapies Beyond A1c

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The DCCT and UKPDS showed that average glycemia, specifically the A1c, best predicts microvascular diabetes complications. Based on these results diabetes practice is thus oriented to target A1c levels, such as < 7% (ADA) or < 6.5%. Variability in glucose levels however, clearly have potential risks beyond A1c including hypoglycemia. Prandial swings and marked hyperglycemia after a glucose challenge indicate important aspects of metabolic diabetes control that are poorly captured by A1c. Marked hyperglycemia after glucose loads or prandially may increase cardiovascular risk. This may be because glucose intolerance and prandial hyperglycemia are linked to the metabolic syndrome and its associated cardiovascular risks. Poor prandial metabolic control may contribute to cardiovascular risk through generation of reactive oxygen species, prandial hyperlipidemia with remnant proteins or other mechanisms. New information shows that marked hyperglycemia may influence the brain with specific changes in cognition and mood. One limit to studying glucose variability clinically has been inadequate indices that are clinically predictive. These are discussed and illustrated in data from recent work. The mechanisms potentially involved in affecting CNS function are unknown but some possibilities are raised.

Obesity, Insulin Resistance and Inflammation: Relationships and Implications

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The worldwide epidemic of obesity has led to a comparable epidemic of type 2 diabetes and is likely to cause a huge increase in cardiovascular disease in the future. For example the recent Euro-Heart study has shown that two thirds of patients who develop coronary artery disease have either known diabetes, unrecognized diabetes or glucose intolerance. Understanding the metabolic consequences of visceral obesity explains why these diseases cluster together and provides a rationale for both prevention and effective treatment.

Visceral adiposity results in an increased release of free fatty acid and cytokines such as tumor necrosis factor alpha and a decrease release of adiponectin. The consequences of these adipose tissue secretory products draining into the liver cause hepatic steatosis, increased VLDL particle synthesis and release and hepatic insulin resistance. The peripheral consequences are muscle insulin resistance, endothelial dysfunction, and activation of the inflammatory cascade.

The clinical consequences are the development of type 2 diabetes in those individuals who have the predisposing genetic factors and accelerated atherosclerosis due to the lipid deposition, inflammation and smooth muscle and fibroblast proliferation.

Reduction of visceral obesity by weight loss or the reversal of the detrimental effects of visceral adiposity by PPAR γ agonists ameliorate the metabolic abnormalities and can delay or prevent the development of type 2 diabetes and should reduce cardiovascular risk.

PPAR- γ agonists (thiazolidinediones): advantages, disadvantages and the future

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The major health impact of Type 2 diabetes is as arterial disease, whether affecting the coronary, carotid, or limb vessels. The major biochemical abnormality associated with this is the constellation of features known as the metabolic syndrome, notably glucose intolerance, hypertension, dyslipidaemia, microalbuminuria, thrombotic abnormalities, in association with increased abdominal girth and insulin insensitivity.

The PPAR- γ agonists, with include the thiazolidinediones rosiglitazone and pioglitazone, appear to be a group of glucose-lowering drugs which specifically target the metabolic syndrome, improving insulin insensitivity, C-reactive protein, and PAI-1, and even blood pressure. Recent

data confirms and quantifies these effects with certainty by comparison with traditional glucose-lowering therapies, while real indications that these agents are better able to preserve islet B-cell function in the longer term has also become available.

Safety concerns are significant however. Animals studies of other drugs in the class have suffered an unusual series of tumour promotion in different tissues. Cardiac failure is certainly a legitimate concern secondary to the problem of fluid retention, and caution is needed over the use of these drugs in at-risk people especially in combination with insulin.

Some of these concerns have limited the development of successors to the thiazolidinediones. But some of the data coming out of studies on these drugs is remarkable for the extent to which it combines glucose-lowering, lipid-lowering, microalbuminuria lowering, and blood pressure lowering effects in one agent.

Cardiovascular Risk Management in Diabetes Mellitus

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Cardiovascular disease is the biggest killer and the most expensive aspect of diabetes. Interventional cardiology has been disappointing in long term outcomes for patients with diabetes with late failure rates that are much higher than those without diabetes. This emphasizes the need for effective prevention and additional research. The multiplicity of risk factors are often not very effectively addressed in patients with diabetes. Aspects of cardiovascular disease prevalence and its prevention are discussed. Dyslipidemia (beyond LDL excess) and its relation to glycemia are discussed. The importance of hypertension, in particular systolic hypertension, as well as lifestyle factors, and emerging risk factors and systems of care are mentioned. Use of combination pharmacotherapy is emphasized to fully control risks.

The Diabetic Foot: a Global Problem

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Diabetic foot ulceration represents a major medical, social and economic problem all over the world, particularly in the Middle East. While more than 5% of diabetic patients have a history of foot ulceration, the cumulative life-time incidence may be as high as 15%. Ethnic differences exist in ulcer and amputation incidences, with both being less common in patients of Indian sub-continent Asian origin living in the UK. Foot ulcers result from the interaction of several contributory factors the most important of which is neuropathy. Diabetic

foot ulceration is common world wide and 2005 has been designated by the IDF as the Year of Diabetic Foot. Foot ulceration remains a huge problem in both developed and developing countries: in some countries in North Africa, the prevalence of active ulcers can be greater than 10% and that of amputations greater than 5%. The introduction of regular screening for foot ulceration and early preventative education and podiatry may do much to reduce the global incidence of what should in most cases be a preventable problem. An up-to-date-review of management of neuropathic foot ulceration will be presented.

Evidence based Guidelines for Type 1 diabetes in Children and Adolescents

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Clinical practice guidelines assist medical staff in the delivery of care, in setting standards of management, guiding best practice especially for the management of acute complications such as diabetic ketoacidosis.

The last 2-3 years have seen formal evidence-basing processes (eg Cochrane review process) applied to the evolution of guidelines for type 1 diabetes in childhood and adolescence. Guidelines have evolved from being based on personal opinion (often based on years of practical experience), through to documents based on expert consensus opinion (eg ISPAD/IDF Consensus Guidelines 2000) to modern guidelines which are formally evidence-based, extensively referenced, peer-reviewed, subject to public consultation and government financed to maintain independence from the pharmaceutical industry.

Evidence based guidelines on type 1 diabetes in children and young people have been released in 2004 by the United Kingdom's National Institute for Clinical Excellence (UK NICE) and also by the Australasian Paediatric Endocrine Group (APEG). They are expensive to produce (in excess of \$150,000) and involve an enormous effort. A key part of developing guidelines is that they be readily available to all interested parties. The above guidelines are freely available at the following web addresses on the internet and may assist others in adapting-adopting these or developing their own.

Locating the evidence is dependent of having access to electronic databases (Medline, Embase, Cochrane Database of Systematic Reviews, PsychINFO and CINAHL databases). Typical search strategies for key clinical questions include the use of key words, MeSH terms (Medical Index Subject Headings) and free text terms and applying such filters as specifying English language and considering only human studies.

The elements needed in developing modern guidelines are summarised in the IDF 'Guide to Guidelines' which is freely available at www.idf.org.

Health Education of the Patient with DM

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There is no question that the world is facing an epidemic of diabetes and its complications. With the best intentions on the part of ministries of health, diabetes health professionals and organisations it is unlikely that sufficient resources will ever be available to cope with the demands for diabetes care appropriately. Hence there is a sense of urgency for the global diabetes community to lead the change in implementing better models that facilitate improved quality of care and prevention strategies at every level. Simply seeing more and more patients in the traditional manner, (which is largely based on acute care models), results in people with diabetes having shorter and shorter consultations with little or no access to some specialist services, diabetes and nutrition education. Diabetes "education" can only be information giving rather than involving the patient in self management strategies through motivation and behaviour change. Therefore a change to a chronic care model is required. Underpinning this model are i) a collaborative team approach and ii) implementation of strategies that facilitate individualised patient self management. Undoubtedly, self management education will become increasingly important for the growing number of patients who find access to their clinicians curtailed in an era of cost-containment.

Education of the Diabetes Educator

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Diabetes education has been called the keystone of diabetes management. People who have diabetes must be able to manage the disease on a 24-hour basis; they must be able to make informed decisions about their own care. This can only happen if they are well informed and understand the complexities of managing the disease. Well-educated health care providers are essential to ensure that people are well informed and to provide support as they learn to manage their own disease. As the numbers of people diagnosed rises this function will have to be performed by other than the traditional physician. In this presentation, initiatives to educate health care professionals currently in place around the world, certification practices and the concept of advanced practice for diabetes educators will be discussed.

Insulin Secretagogues in Type 2 Diabetes: Putting Theory Into Practice

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Type 2 Diabetes is reaching epidemic proportion on a global scale with an exponential rise in both numbers as well as its serious health consequences, driven by the epidemiological triad of obesity, physical inactivity and increasing age. Coronary heart disease associated with type 2 diabetes has become a substantial clinical challenge requiring multifactorial targeted preventative and treatment strategies.

The nature of type 2 diabetes is complex, but essentially comprises a bipolar combination of defective pancreatic beta cell function and a variable degree of insulin resistance, associated with inter related metabolic dysfunction including hypertension and dyslipidaemia, important modifiable risk factors requiring specific intervention therapies.

By the time of diagnosis of type 2 diabetes, beta cell function may have deteriorated by 50%, influenced by a number of adverse factors such as glucose toxicity and oxidative stress. UK PDS data has shown that treatment with insulin and with sulphonylureas shows similar numbers achieving satisfactory glycaemic control compared to those on diet alone, with HOMA analysis suggesting that sulphonylureas may help maintain pancreatic beta cell function rather than accelerate decline.

Treatment strategies for type 2 diabetes must place emphasis on lifestyle management and, when intensively encouraged, can be very effective. However, pharmacological therapies are usually required in due course to meet tighter set, evidence-based targets. Various oral hypoglycaemic agents are available with prescriber selection made on a number of therapeutic considerations. Sulphonylureas with over 40 years of clinical experience remain the most potent drugs for improving glycaemic control, and can be used effectively as mono-therapy or in combination with other agents including metformin, glitazones and in certain circumstances with insulin.

The choice of sulphonylurea will be determined by a number of considerations including efficacy, selectivity, side effect profile and other potential advantageous properties. The introduction of the new formulation gliclazide modified release, on a background of over 25 years experience with gliclazide has resulted in publication of a number of recent research studies, including interesting pharmaco-kinetic observations on basal, post prandial and pulsatile insulin secretion.

The impressive Steno 2 Study of patients with type 2 diabetes and microalbuminuria employed multifactorial risk factor intervention therapies, both behavioural and pharmacological, and achieved impressive outcomes reducing complications by about 50%. Glycaemic therapy was determined by various combinations of gliclazide MR, metformin and insulin. The recently published GUIDE Study, a multicentre European Double-Blind and Randomised Comparison of Gliclazide MR and Glimperide established comparable efficacy, weight neutrality and in particular a significantly better safety profile

of gliclazide MR with 50% fewer confirmed hypoglycaemic episodes in comparison with glimepiride. The GUIDE data will be presented.

IGT and Type 2 Diabetes in Polycystic Ovary Syndrome {PCOS}

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There is increasing evidence that women with PCOS have Impaired glucose tolerance[IGT] and Type 2 Diabetes Mellitus [Type 2 DM]. Also PCOS has been found to be more common in women with history of Gestational Diabetes.

Multiple independent factors contribute to the increased risk of IGT and Diabetes including; Obesity, Chronic Anovulation, Insulin Resistance ,beta cell Dysfunction and family history of Type 2 DM.

It is reported that hyperinsulinemia produces the endocrine changes of PCOS by increasing ovarian androgen production, particularly testosterone and androstenedione and by decreasing the serum sex hormone concentration.

Many of the symptoms of PCOS respond to weight loss probably because it improves insulin sensitivity which reduces insulins interference with normal sex hormone production and action.

Insulin lowering agents such as Metformin, Pioglitazone and Roseglitazone used in the treatment of Type 2 DM have been shown to reverse the endocrine abnormalities of PCOS within 2-3 months.

Obesity in the Arab world

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Obesity is a condition of excess body fat. It is the most common form of malnutrition in the western world. The situation in the developing countries is extremely worse.

Obesity is the net result of as excess of energy consumption over expenditure. Factors that must be considered as contributing to causation are: heredity, overeating, altered metabolism of adipose tissue, defective or decreased thermogenesis and decreased physical activity without an appropriate reduction in food intake.

Overeating is clearly the prominent contributor to obesity. Feeding behavior occurs in response to hunger and to appetite induced by the presence of food.

The paper discusses the prevalence of obesity, the causes of increased obesity in the Arab world and the metabolic abnormalities caused by the production of hormones and cytokines by the fat cell.

Primary Health Care Integrated Obesity Program

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Objectives: To design, implement, and assess PHC integrated obesity control program for Qatari women aged 15-49 years. **Design:** Eight-Week weight reduction program followed by Twenty-Four week maintenance phase, conducted from September 2000 to April 2001. **Participants and Setting:** 81 Qatari obese women (39 non-diabetics and 42 diabetics) recruited at the largest four PHC centers in Doha capital. The mean age was 33.9 years and body mass index (BMI) 32.4. **Intervention:** Combined structured exercise and lifestyle activity, low caloric diet of about 1200 kcal/d and behaviour modification conducted by trained PHC nurses. **Main Outcome Measures** Changes in body weight, body mass index cardiovascular risk profiles at 8 weeks and at 24 weeks. **Results** Seventy-nine (97.5%) of 81 obese women completed the 8-week study. Sixty-seven (84.8%) of them completed the entire 24-week study. At 8-week a greater decrease (95% CI) of the following measures: body weight (-4.8%; P=0.000), body mass index (-2.0%; P=0.000), waist circumference (-4.7%; P=0.000), systolic blood pressure (-3.7%; P=0.004), and total cholesterol (-0.28%; P=0.003). Similar significant decrease was resulted at 24-week. Among the obese diabetic group a significant reduction (95% CI) of Hb Ac% at 8-week (-0.93; P=0.000) and at 24-week (-0.80%; P=0.028) was obtained. **Conclusion** The study demonstrates the feasibility of providing effective PHC integrated weight management by use of non physician professional. However, the barriers to both PHC receiver and provider involvement in obesity management warrant further investigation.

The Therapeutic patient education - An essential part of diabetes care, how to integrate patient education into type 2 diabetes routine care

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For many years, patient education programmes for people with diabetes and hypertension have been evaluated in the health care system. Since 1991, office-based physicians have been remunerated for providing structured treatment teaching programmes for outpatients with diabetes mellitus. Today, with the nationwide implementation of disease management programmes for diabetes and coronary heart disease, these programmes have become more and more popular. To date, four different programmes have been implemented in the German healthcare system. Remuneration costs amount to 130 EUR per patient and completed course. Data collected on people with diabetes or hypertension demonstrate the efficacy of the programmes at the treatment level. The results demonstrate the practicability and the efficacy of the

implementation of programmes as an integral part of the disease management in routine care.

Epidemiology, risk factors and chronic complications of diabetes in the Gulf countries

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Diabetes Mellitus beyond no doubt is the major health problem facing most countries especially ones with a lot of change in their lifestyles like Gulf Countries. It is clear that one-quarter of the general population in the Gulf countries are suffering from Diabetes mainly Type 2. This high prevalence is related to the major risk factors, i.e. obesity, high calorie intake, lack of exercise.

Since diabetes is a chronic disease, its major mortality comes from the high morbidity in the form of chronic complications. There has been growing data in the Gulf countries highlighting vasculopathy to be very common in diabetic patients leading to ischemic heart disease, cerebrovascular disease, and periprovascular disease. Gulf countries are considered to have highest prevalence of chronic complications due to diabetes. Diabetes is the leading cause of blindness, non-traumatic amputations, renal failure, etc. with growing evidence that it is correlating with poor glycemic control in the Gulf countries.

There are certain unique risk factors in this area of the world that have amplified this problem i.e. cultural factors, health beliefs, etc. that will be discussed in more details.

Epidemiology, clinical management and outcomes of diabetic pregnancies in the Arab world: An overview

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Background: Diabetes mellitus (DM) during pregnancy is common in Arab women reflecting their increased fertility and the prevalence of DM in the background population.

Epidemiology: A high prevalence of gestational Diabetes (GDM) and of gestational impaired glucose tolerance (IGT) was found in Kuwait (GDM 43%; NIDDM 22%), Bahrain (5.4%), Syria (14.3%), Saudi Arabia (10.3%; 1.9% GDM & 8.4% IGT), Tunisia (4.6%) and Egypt (3.5%). GDM was increased in immigrant Arabs in Australia (7.3%). The high combined rates of DM, IGT and IFG of 32.3% found in Arab women in the USA will predictably translate into high rates of GDM. There were high rates of established DM and GDM among the immigrant women (including Arabs) at 8.9 and 31.9 per 1,000 births compared with 3.6 and 4.5 per 1,000 in ethnic Norwegians respectively. Risk factors for diabetes during pregnancy included older age, obesity, family history of diabetes and high parity, previous macrosomia and urban

rather than rural residence. **Management:** Screening for diabetes was not uniform and several criteria are being used in different regions mainly using those from ADA and WHO. Fasting plasma glucose, Glucose Challenges Tests, Oral Glucose Tolerance Tests were employed by different groups. In established DM, unplanned pregnancies and late presentations are seen too often. Comprehensive locally-developed and agreed clinical guidelines are available in some institutions (King Faisal, Saudi Arabia). Simplified management approaches are also described in less resourced regions (Sudan, Jordan and Tunisia). They recommend use of diet followed by insulin based on blood glucose. However, practices based on them need to be subject to audit. **Outcome of diabetic pregnancies:** Outcome data are variable in different regions. Increased maternal complications included urinary tract infections, macrosomia, pre-eclampsia, postpartum haemorrhage and starvation ketosis. Maternal obesity was implicated in higher risk of adverse maternal outcome. Higher risk of Caesarean section was described with a wide range (7.7-47%). Diabetes-related maternal mortality was not precisely documented despite large cohorts from Saudi Arabia and Libya. Perinatal mortality rate was greater in established diabetes and gestational diabetics. Unexplained deaths were particularly common in both groups in Kuwait and Bahrain. Macrosomia is common in GDM. Macrosomia is associated with protracted labor, shoulder dystocia, perinatal asphyxia and skeletal and nerve injuries. Dystocia resulted in increased rates of birth injuries. Major congenital defects were increased. Risk factors for poor outcome included older age, poor glycaemic control, Morbid maternal obesity, grand multiparity (although not universally), hypertension and presence of microvascular complications

Conclusion: Arab women are at high risk of diabetes during pregnancy. Current managements and outcomes are variable but mainly suboptimal.

Diabetic Ketoacidosis

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Mortality of type 1 diabetes in children is higher in countries where awareness, expertise and health delivery resources are limited. Even in developed countries 20-30% of newly diagnosed children with type 1 diabetes present in diabetic ketoacidosis. The main causes of diabetic ketoacidosis are at diagnosis of diabetes, insulin omission and intercurrent illnesses.

A specialist/consultant paediatrician with training and expertise in the management of diabetic ketoacidosis should direct management. The child should be cared for in a unit that has experienced nursing staff trained in monitoring and management of diabetic ketoacidosis, clear written guidelines for managing diabetic ketoacidosis and access to laboratories that can provide frequent and accurate measurement of biochemical variables.

Diabetic ketoacidosis is the most common cause of death in newly diagnosed type 1 diabetes with the greatest risk of mortality due to cerebral oedema. The management of cerebral oedema in diabetic ketoacidosis is a medical emergency and treatment (fluid restriction, mannitol, neurological assessment) should be initiated in an intensive care facility as soon as the condition is suspected.

The most authoritative statement on childhood diabetic ketoacidosis is the European Society for Paediatric Endocrinology and the Lawson Wilkins Pediatric Endocrine Society Consensus Statement on Diabetic Ketoacidosis in Children and Adolescents. (*Dunger DB et al. Arch Dis Child. 2004 Feb;89(2):188-94.*)

Musculoskeletal Complications of Diabetes

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Diabetes Mellitus (DM) is known to cause multiple musculoskeletal complications such as diabetic foot disease, increased rate of infections, and delay in wound healing. However, the clinician needs to be aware that DM is a pre-disposing factor to other problems such as degenerative lumbar spinal stenosis, shoulder stiffness, primary pyomyositis, joint arthropathy, cheirography, amyotrophy, mononeuropathy, autonomic neuropathy and infection of total joint arthroplasty.

The management of musculoskeletal complications in the diabetic patient should be accomplished by an understanding of all the biologic components, the mechanical characteristics of bones and soft tissues, gait kinematics, the vasculature at a microscopic and a macroscopic level, the immune system, and the fundamental processes of wound healing. Clinical treatments that address the biological aspects of the problem without considering the mechanics, or vice versa, can sometimes be effective but fail to take advantage of all the potential means to succeed. This paper presents clinical cases and guidelines for a comprehensive approach to address the many synergistic factors that cause these musculoskeletal complications.

Mental Health, antipsychotic drugs, and diabetes: A review and management guidelines

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It has been recognized for over 60 years that patients with schizophrenia have an increased risk of abnormalities of glucose regulation and overt diabetes. This increased risk probably also extends to other features of what is recognised as the 'metabolic syndrome', leading to macrovascular and microvascular complications. More than normal rates of

depression can be detected in patients with clinically manifest diabetes and a positive correlation between insulin resistance and severity of depressive symptoms is present in subjects with impaired glucose tolerance before the progression to Type 2 diabetes. Several studies have confirmed recently that the use of any antipsychotic drug is associated with an increase in newly diagnosed diabetes. However published data on this subject is conflicting. The difficulty is illustrated by the observation that most patients in these studies have additional risk factors for diabetes. It is possible that patients prescribed typical antipsychotics were less likely to take their medications because of side effects. The use of an atypical neuroleptic maybe linked to better health care in an environment where a diagnosis of diabetes is more likely to be made.

Recent retrospective data examining the relationship between schizophrenia and diabetes concluded that we could not necessarily blame anti psychotic medication when diabetes is diagnosed in an individual with schizophrenia. Schizophrenia maybe an independent high risk factor for developing impaired glucose tolerance and diabetes. The chronic stress, which is a common feature of schizophrenia, incurs adrenal and cortisol release which when sustained is associated with abnormal glucose metabolism and overt diabetes.

Most retrospective studies indicate that there is a high risk of developing impaired glucose tolerance or diabetes in patients taking atypical compared with conventional anti psychotic or no drugs. However it is not possible to conclude as there is a causal relationship, although abnormalities in glucose metabolism maybe a glass effect associated with the administration of anti psychotics.

Managing diabetes risk in people with schizophrenia highlights the need for prevention and screening. Patients treated with atypical anti-psychotics should be monitored for symptoms of hyperglycaemia and those patients with hyperglycaemia should undergo fasting plasma glucose testing. On initiation or switching an anti psychotic, the selection of the drug agent should be based on efficacy. One should provide lifestyle guidance, base line assessment to include plasma glucose and HbA_{1c} measurements and if abnormal refer them for further investigation. A change of antipsychotic is usually unnecessary. Patients on anti psychotic should receive life style guidance, plasma glucose and questioned about symptoms of hyperglycaemia. Diabetics on anti psychotics need optimisation of the management of schizophrenia and a referral to the diabetologist to manage diabetes.

Diabetes and microalbuminuria in hypertensive heart disease

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We have previously shown in the Losartan Intervention For Endpoint reduction in hypertension (LIFE) study that baseline urinary albumin excretion was closely related to risk for cardiovascular events in non-diabetic and diabetic patients as well.

We have determined the relationship between albuminuria and cardiovascular risk in 8206 hypertensive patients with left ventricular hypertrophy. Follow-up was 39,122 patients. Urinary albumin/creatinine ratio (UACR) was measured by morning spot urine. The risk for the primary composite cardiovascular endpoint increase continuously from the lowest to the highest decile of baseline UACR. No specific threshold could be identified. Risk for cardiovascular morbidity and mortality among hypertensive patients with left ventricular hypertrophy increases at much lower UACR, than has been reported in diabetic patients. Furthermore, losartan was superior to atenolol in reduction of albuminuria, and a decrease in albuminuria during treatment was accompanied by a decrease in cardiovascular events. Losartan-based antihypertensive therapy was more effective than an atenolol-based regimen in preventing cardiovascular disease, cardiovascular mortality and all-cause mortality in diabetic hypertensives with left ventricular hypertrophy. This favorable outcome with losartan appears to be linked to benefits over and above blood pressure reduction and was associated with a somewhat better tolerability. New-onset diabetes mellitus occurred in 241 losartan (13.0 per 1000 person-years) and 319 atenolol patients (17.4 per 1000 person-years); relative risk 0.75 [95% CI 0.63-0.88], p=0.001. Moreover, there was a steadily increasing risk of diabetes with increasing levels of risk score; patients in the highest quartile was at considerably higher risk than those in the three lower ones. Compared to atenolol, losartan treatment was associated with lesser peripheral vascular hypertrophy/infarction and higher insulin sensitivity. The relative change in minimal forearm vascular resistance and insulin-sensitivity were inversely related supporting the hypothesis that peripheral vascular changes in hypertension may induce insulin resistance. The ability of losartan to preserve insulin sensitivity may explain the lower incidence of new onset diabetes in patients treated with losartan in the LIFE Study.

Diabetes and Coronary Heart Disease: Induction of Neo-Angiogenesis as New Treatment Option

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Particularly diabetic patients suffering from Coronary Heart Disease (CHD) are often presenting with a diffuse atherosclerotic pathology of the coronary arteries. The treatment options therefore are limited – and it is a common experience that interventional procedures (like PTCA, Stent) or surgery (CABG) is not amenable in this patient group. The induction of neo-Angiogenesis by genetically engineered

growth factors is a new, promising attempt of treatment for diabetic patients with CHD.

Between 1995-1997, our group has performed the world-wide first clinical trial using Fibroblast-Growth-Factor (FGF-1) as adjunct to CABG in patients with diffuse CHD; in 2000, a second clinical trial was performed applying intramyocardial injection of FGF-1 as a sole therapy for CHD-patients. In summarizing the results of both studies, (1) we saw no side effects; (2) a significant increase in vessel density and myocardial perfusion score could be demonstrated by SPECT and angiography; (3) 80% of all patients showed a significant improvement of maximum working capacity 12 weeks following the treatment. To date, a multicenter trial is being performed in the US under FDA-guide lines (36 patients); the first results of that trial are replicating the previous experience in Germany.

Angiogenic therapy of CHD by intramyocardial injection of FGF-1 seems to become a new treatment option – particularly for diabetic patients with diffuse CHD not amenable to PTCA and/or CABG. The future indications of that type of angiogenic treatment – being a protein therapy, in contrast to gene therapy – will be (1) adjunct to bypass surgery, and (2) sole therapy for no option heart patients.

Glycemic control and vascular complications in the treatment of Type 2 DM

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Type 2 diabetes continually worsens due to progressive beta cell failure and insulin resistance. Monotherapy fails to provide adequate glycemic control over time, necessitating addition of medications with complementary mechanisms of action.

Study results indicate that simultaneous rather than sequential administration of agents that address both insulin resistance and beta cell failure may be appropriate in patients who fail diet therapy.

The presentation will focus on the most effective combined therapies which may achieve tight control of blood sugar levels and decrease the complications of DM.

Management of Diabetic Neuropathy and Erectile Dysfunction

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Diabetic neuropathy is amongst the commonest of the long-term complications of diabetes and can only be diagnosed by a careful clinical examination of the lower extremity as up to 50% of patients with sensorimotor neuropathy may be asymptomatic at any one time. Erectile dysfunction is

probably the commonest manifestation of autonomic neuropathy although its aetiology is multifactorial. Diabetic sensorimotor neuropathy is a diagnosis of exclusion of other often more sinister causes. The first line in management is optimisation of glycaemic control with the avoidance of blood glucose flux which is thought to be important in the genesis of neuropathic pain. Commonly used drugs in the management of symptomatic neuropathy include the tricyclics, anti-epileptics and analgesics such as Tramadol and occasionally Oxycodone. First-line therapy should remain the tricyclic drugs as these have proven efficacy in many trials although predictable side effects can be troublesome. Commonly used anti-epileptics are Gabapentin and Pregabalin.

The management of erectile dysfunction requires a careful history and exclusion of non-organic causes. The careful psychological assessment is essential as ED is usually of multifactorial aetiology. Occasionally modification of medications may be useful in the management of erectile dysfunction as many drugs such as Thiazide diuretics, that are commonly used in diabetes may contribute to ED. The development of orally-active therapeutic agents such as Sildenafil have revolutionised the management of ED in diabetes as up to 65% of patients with type 1 and type 2 diabetes may be expected to benefit from this class of drugs. Invasive treatments such as injections of vasa active agents or the transurethral administration of similar agents is only occasionally required.

Insulin therapy: current and future

Home P

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Insulin therapy has a long history, but made frustratingly little progress until the last 10 years. The groundwork for this began in the 1980s with the demonstration of what had long been suspected, that insulin absorption profiles were inappropriate for the purposes for which insulin was injected, and that erratic insulin absorption markedly compounded the problem. The advent of rapid-acting insulin analogues dealt with the absorption profile problem to a large extent for meal-time insulin, but further exposed the problem of poor basal insulin supply, particularly in people with Type 1 diabetes. More recently the introduction of insulin glargine, a long-acting insulin analogue, has allowed the advantages of the rapid-acting analogues to be demonstrated, and the combination of these insulins has become standard practice as a result. Even more recently, insulin detemir, a novel long-acting insulin analogue with improved consistency of action, promises to offer further advantage to those people with problems of erratic insulin absorption.

These insulins also offer promise in Type 2 diabetes. Proper dose titration of the new basal insulins, particularly if used in combination with sulfonylureas and metformin, can attain blood glucose control (target HbA_{1c} without problematic

hypoglycaemia) impossible to achieve with the conventional insulins. Other approaches to insulin therapy include insulin pumps and inhaled insulin, though the degree to which the devices involved in these approaches are acceptable to patients limits their application.

For the further future, work on genetic engineering of cells (self and stem cells) to produce insulin gains pace yearly. Real promise of a release from insulin injections is at last a genuine prospect.

Oral Agents in The Management of DM

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The management of type 2 diabetes requires treating the underlying defects of insulin resistance and insulin deficiency. Insulin resistance secondary to obesity is the initial abnormality. The response to insulin resistance is compensatory hyperinsulinemia which initially maintains euglycemia. In individuals with the genetic predisposition for type 2 diabetes, beta cell function deteriorates progressively. This results in Impaired Glucose Tolerance which progresses to postprandial hyperglycemia and finally fasting and postprandial hyperglycemia.

Therapy should therefore be directed initially at treating insulin resistance with insulin sensitizers such as metformin or thiazolidinediones. These two classes of sensitizers have different modes of action and different target tissues and can be used together to obtain additive benefits. If there is significant beta cell deficiency, insulin secretagogues should be added to the insulin sensitizers. When combination insulin sensitizers and insulin secretagogues are unable to achieve target glycemic goals, basal insulin therapy to control fasting hyperglycemia should be added to the combination oral therapy. If patients lose most of their beta cell function and need to be placed on multiple injections of insulin, they need to continue the insulin sensitizer.

Management Of Diabetic Dyslipidemia

Salti I

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Diabetic dyslipidemia, is amongst the leading factors that contribute to the high rate of cardiovascular morbidity and mortality in diabetes. It is a common finding and, as an outcome of insulin resistance, can precede the onset of diabetes. The typical profile in diabetic dyslipidemia is the atherogenic triad of increased serum triglycerides, decreased serum HDL-cholesterol and increased proportion of small dense LDL-cholesterol.

The aim of treatment in diabetic dyslipidemia are as follows: Reduce serum LDL-cholesterol to less than 100 mg/dL. Recent recommendations have suggested making this target less than than 70 mg/dL.

Change the quality of LDL-cholesterol particles from small dense particles to less dense larger particles

Reduce serum triglycerides to less than 150mg/dL

Raise HDL-cholesterol to greater than 40mg/dL

To achieve the above targets, the following measures are recommended:

Life-style changes (diet and exercise) in order to reduce visceral obesity

Ensure adequate glycemic control

If the above measures are not enough to achieve the desired targets, consider the following pharmacological interventions depending on the patient's lipid profile:

Statin monotherapy

Fibrate monotherapy

Niacin (slow release) monotherapy

If monotherapy with any of the above does not achieve the desired targets, combination therapy should be considered. The following options of combinations are recommended depending on the patient's lipid profile:

Statins plus fibrates especially if statins alone have not achieved the desired levels of serum triglycerides and/or HDL cholesterol Statins plus niacin especially if statins alone have not achieved the desired levels of LDL-cholesterol and or triglycerides and HDL-cholesterol Fibrates plus niacin, especially if either alone has not achieved the desired level of triglycerides and or HDL-cholesterol

Management of Diabetic Nephropathy

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Diabetic nephropathy is an increasingly common problem in patients with both type 1 and type 2 diabetes. It may be present very early after the diagnosis of type 2 diabetes and even at diagnosis. The earliest manifestation is microalbuminuria followed by frank proteinuria: in the early stages aggressive management of hypertension particularly with ACE inhibitors is indicated, with caution being taken in patients with type 2 diabetes and vascular disease because of the risk of renal artery stenosis. Glycaemic control is also of utmost importance in the early stages of diabetic nephropathy. Those patients with established frank proteinuria and approaching end-stage renal disease require a multidisciplinary approach to management with control of blood pressure and fluid balance being crucial. Increasingly ACE inhibitors or A2-receptor blockers are being used even in the later stages of renal disease with careful monitoring of serum potassium. Although the treatment of choice for diabetic nephropathy is prevention, for those reaching end-stage renal disease peritoneal dialysis has some advantages over haemodialysis in diabetic patients. The treatment of choice for end-stage renal disease is of course renal transplantation although the availability of suitable donors is of course unpredictable. Increasingly in some centres patients

are being offered combined pancreas and renal transplants although the long-term effects of such combined transplantation in diabetic patients with renal failure requires further study.

Practical Aspects of Initiating and Advancing Insulin Therapy

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In this session, two or three cases will be presented with some background information on common rules for successfully initiating and adjusting insulin therapy. The primary principles espoused employ pattern management, a method of determination of glucose patterns and management response based on that analysis that is usually used on an outpatient basis. Identification of variables other than medication that may influence glycemic patterns will be reviewed. Setting priorities in patients with different degrees of insulin deficiency and risks of hypoglycemia will be addressed in the cases and background.

Management of insulin resistance syndrome

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Not much genetic evolution has occurred in humans in the past 20,000 years. In the palaeolithic age, our 'thrifty genotype' was well-adapted to the high level of physical activity associated with our hunter-gatherer existence. However, this genotype has become redundant in the presence of our sedentary lifestyle and a diet low in fibres and rich in animal fats and glucides. In short, our genotype - no longer adapted to our lifestyle - has become a 'susceptibility genotype', leading to increased visceral adiposity. When adiposity reaches a certain threshold, adipocyte-derived monocyte chemoattractant protein-1 (MCP-1) induces macrophage activation and infiltration. Activated macrophages secrete proinflammatory cytokines such as TNF α and IL-6 that can impair adipocyte insulin sensitivity and stimulate further activation and infiltration of peripheral monocytes and macrophages into fat. These amplifying signals increasingly impair adipocyte insulin signaling and eventually cause systemic insulin resistance, leading to the metabolic syndrome ('Syndrome X') that can be considered as the pathological expression of the 'susceptibility genotype'. It is a disease of the modern western lifestyle characterized by hyperinsulinemia, visceral obesity, reduced glucose tolerance, dyslipidemia, hypertension, and a pro-coagulatory state. This variety of risk factors converge on the artery to promote atherogenesis. Skeletal muscles may be resistant to insulin action, which decreases the utilization of glucose, causing hyperglycemia. In the face of the insulin resistance, the pancreas initially attempts to compensate by producing more insulin, yielding hyperinsulinemia, itself a risk factor for arteriopathy. A high burden of abdominal fat presents the liver

with elevated levels of free fatty acids through the portal circulation. This excess of free fatty acids will drive overproduction of TG-rich lipoprotein particles, including VLDL. A reciprocal decrease in HDL accompanies the hypertriglyceridemia characteristic of the type II diabetic state. In addition to increased fasting TGs, patients with insulin resistance may have an accentuated response to dietary fat, yielding an exaggerated postprandial lipemia. Proinflammatory cytokines released by adipocytes not only have direct effects on vascular wall cells that can promote atherogenesis, but also can elicit the production of acute phase reactants by the liver, including CRP (an independent indicator of cardiovascular risk and of incident diabetes), increased fibrinogen (a substrate for increased thrombosis), and an increase in the inhibitor of fibrinolysis, PAI-1. Hypertension is also a well-known promoter of atherogenesis. Genetic factors may play into susceptibility to type II diabetes and atherosclerosis as well. Finally, the formation of advanced glycation end products from glycated macromolecules can engage cell surface receptor for AGE (RAGE) and compound the inflammatory stimuli encountered by the arterial wall in patients with type II diabetes. The expectation that strict glycemic control alone can mitigate atherosclerosis in type II diabetes does not take into account the multiplicity of contributory metabolic and inflammatory factors. Since insulin resistance began to be appreciated as having a key role in the pathophysiology of type 2 diabetes and its cardiovascular complications, it became clear that insulin resistance is a logical target for pharmacological intervention. If insulin sensitivity could be improved, not only should hyperglycaemia be reduced, but also the beta cell need not produce so much insulin (thereby reducing hyperinsulinaemia). In addition, the metabolic consequences of insulin resistance - including dyslipidaemia, hypertension, disordered coagulation, microalbuminuria and atherosclerosis - might also be reduced. Treatments as thiazolidinediones enhance insulin sensitivity in adipose tissue, skeletal muscle, and the liver. Moreover, drugs used to treat dyslipidemia and hypertension, ie. statins, fibrates, and agents that disrupt angiotensin II signaling, have anti-inflammatory properties that may contribute to additional vascular benefits on the top of their antiatherogenic effects.

Intensified Control in Childhood and Adolescent Diabetes

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The DCCT demonstrated the risk reduction provided by intensified glycaemic control on the appearance and progression of microvascular complications of diabetes. The EDIC study demonstrated that this risk reduction was maintained for several years even after glycaemic control had reverted to a higher mean level. Despite many advances many centres report little or no improvement in metabolic control over the past 5 years. Factors influencing this experience

include fear of hypoglycaemia, irregular and unpredictable insulin absorption, variable exercise patterns, variations in insulin resistance as well as psychosocial factors which limit adherence to management regimens.

The natural history of type 2 diabetes – from diagnosis to secondary failure

Belton A

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Type 2 diabetes is a progressive disease, eventually the beta cells will be exhausted and the person will have little to no endogenous insulin. People diagnosed with type 2 diabetes think of it as not as serious as type 1 and something that can be controlled by pill, exercise and careful meal planning. This discussion will focus on the acceptance of insulin as a management tool in type 2 diabetes, and how and when insulin should be added to the management plan for a person with type 2 diabetes. Case studies will be used to illustrate the discussion.

Managing complications: The responsibilities of the diabetes educator

McGill M

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Diabetic complications are the major cause of morbidity and mortality in people with diabetes. However many of these can be prevented by early detection and prompt expert treatment. In the past the assessment and management of complications has been the domain of the doctor. However with the epidemic of diabetes occurring globally there is no doubt that to cope with demand, the diabetes nurse specialist will have to take on more of this clinical role. This is not a unique concept and in fact diabetes nurses have been involved in the assessment and management of complications in some countries for nearly 20 years. To this end, this workshop, underpinned by the philosophy that the nurse can contribute to the medical management of the person and not just be a performer of tasks, will describe the screening procedures that nurses can undertake, the rationale for why the procedures are done and what the test results mean in the light of current clinical trial data.

Intensifying insulin management

Belton A

Anne B Belton & Associates, Calgary, AB, Canada

Intensive insulin management is not just for people with type 1 diabetes. Anyone who has to take insulin can and should be taught to intensify insulin management to achieve blood glucose levels in the target range. Intensifying insulin management may mean different things to different people, but for all it should mean understanding the concepts of insulin therapy well enough to be able to make personal

management decisions to optimize blood glucose levels. Case studies will be used to illustrate this discussion.

A Controlled Trial of Structured Diabetes Care in Primary Health Centres in the United Arab Emirates

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Objective: To evaluate the long-term impact of a structured approach to improving the quality of diabetes care in general practice in the United Arab Emirates. **Design:** Controlled before-after trial within a health district with three primary health centres (PHCs) in the intervention group and the six remaining serving as controls. Outcomes and adherence to guidelines were measured over the year before the intervention began and for a second one-year period at the end of the intervention period. Data was collected by chart abstraction. **Setting:** The study was performed in primary health care centres in the United Arab Emirates. **Study Participants:** Subjects continuously followed in nine PHCs for diabetes care for the period of the study (N=753) were included into the study. **Intervention:** Structured diabetes care, including the development of general practice diabetes clinics, a patient education program, a healthcare professional education program and improved recording of clinical data, was provided for the 33-month time period. **Results:** There was a statistically significant improvement in three of the process of care variables (ordering HbA1c, cholesterol and documenting foot examinations) while the three remaining variables did not improve. There was limited impact on outcome variables. **Conclusions:** The intervention described in this study demonstrated an improvement in some process of care measures suggesting a positive impact of this type of delivery model in this environment.

Glycemic control in a Kuwaiti diabetic population

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Objective: To study the level of glycemic control in the diabetic Kuwaiti population and factors related to it in these patients. **Patients and methods:** A population-based study of 251 diabetic patients (T1DM and T2DM) being followed up in diabetes out patient clinic at Alamiri hospital, were evaluated for the glycemic control. In addition to the routine biophysical data, we measured the glycated hemoglobin, lipid and renal profile, urinary microalbumine and total urinary protein excretion. **Results:** Of the 251 patients, 72 (28.7%) were having good glycemic control with HbA1c of <7%, 56 patients (22.3%) were considered to have fair glycemic control with HbA1c between 7 and 8%, the other 123 patients (49%) were having HbA1c level of >8% and considered to be of unacceptable level of control. Factors associated with poor glycemic control were older age (p = 0.0), longer duration of DM (p = 0.000), obesity (p = 0.015) and being of female sex (p = 0.047). Diabetic retinopathy (any stage) was found in

37.1% and associated with poor glycemic control ($p=0.002$), proteinuria (micro and macro) found in 43.8% and significantly associated with poor control ($p=0.000$), peripheral vascular disease which presented in 6% of the patients, was associated with poor control ($p=0.046$). Patients on diet management only (9.6%) were more likely to be controlled compared to those on pharmacological therapy ($p=0.001$), also patients on oral anti diabetic therapy (alone or combined with insulin) (54.2%) are more likely to have better control compared to patients on insulin alone ($p=0.019$). **Conclusion:** We conclude that although more than half of the patients are having acceptable level of glycemic control, yet the majority is not meeting the goals of tight glycemic control, and a more intensive approach is needed to reach this purpose, particularly in terms of weight reduction, and pharmacological therapy.

The Primary Care for Diabetes in Oman: the past and the future

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Objectives: To describe major changes undertaken to improve the primary care infrastructure for diabetes in the last decade and half in Oman. **Background:** Since diabetes mellitus (DM) is considered as one of the major disease burdens of today; health care organizations in Oman realized the importance of prevention, early detection and control of this major problem through the Primary Health Care setting. The DM mini-clinic system was first introduced in the PHC setting in 1996 together with the initiation of the DM register a small diabetic team & a mini pharmacy. Despite the many obstacles faced at the beginning, the Ministry of Health managed to overcome such obstacles. Efficient diabetic teams were gradually built at each of the health centre level. In addition the health centres have been provided with easy access to the secondary/tertiary health care for further advice & management.

The national diabetes programme (established in 1996) added much support to make the mini-clinic system work more efficiently. Plans are underway to have graduate family physicians to conduct chronic disease clinic including diabetes.

This presentation will also provide a brief description of the successful models of implementing diabetes care as part of primary health in Oman, to compare diabetes care before & after the establishment of the mini-clinic, to discuss the obstacles faced & ways to overcome such obstacles.

Evaluation of the referral system of the diabetic patients between primary health care centers and the diabetic clinic: Particular view to Gurayat Region

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Background:The Diabetic Clinic at King Faisal Hospital is

a referral clinic. Referral is an important process between the Primary Health Centers (PHCs) and hospitals. it is a two way process. The referral form is a request written by the PHC physician and sent to the specialist clinics. The referral form contains data about the patient regarding his/her current illness. **Objective:** To evaluate and compare the data contained in the referral forms sent by primary health care center's physicians to the diabetic clinic in comparison with that adopted by the American Diabetes Association (ADA) and the recommendations adopted by the quality assurance of primary health care committee (Ministry of Health -KSA-1992). **Method:** Four hundred and thirty (430) referral forms were collected during the period of Jan 2002- Dec 2003. The sample was stratified into 16 classes according to the primary health care centers. A total of 215 referral forms were selected by random simple systemic method (2:1) from each class. Each form was reviewed, information in each form was analyzed. Data were classified into two parts; administrative and medical part. A scheme contained the standard information required was designed. Degree of performance in each part was calculated. **Result:** Two hundred and fifteen (215) referral forms were randomly selected (89 male and 126 female). Administrative performance was 94.18% and the medical performance was 22.48%. Primary health care medical staffs give considerable attention to the administrative process while little attention was given to the medical data included in the referral forms. **Conclusion:** The referral system is an important process and needs great attention and regular review to evaluate its components and its efficacy.

The relationship between diabetes and some psychological factors

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Background & Objectives: Emotional issues play an important role in the lives of people with diabetes. Empirical evidence suggests that psychological factors play an important role in the occurrence of diabetes. Therefore, the goal of this study is to find out the relationship between diabetes and some psychological factors (i.e. Type A behavior, Neuroticism, Aggression and Anger) in Kuwait society, without attempting to find a cause and effect relation. **Method:** A sample of 230 participated on the study. 122 diabetic patients (51 type 1, and 71 type 2) were recruited from the outpatient diabetes clinic. Whereas, 108 non-diabetic subjects were recruited as a control group. The age ranged between 13 to 73 with a mean of 36 years and $SD=15$. The study used 4 scales to collect data. 1) The Arabic Type A behavior scale. 2) The Neuroticism Scale. 3) The Aggression Scale. 4) State-Trait Anger Expression Inventory. **Results** shows that diabetic patients score higher on type A behavior than non-patients, whereas, non-patients are higher on anger-state, anger-trait and anger-expression. In addition, Type 1 diabetic patients are more aggressive, and score higher on

anger-state than type 2. Males tend to be more type A behavior than females, whereas females are more neuroticism. Age-correlated positively with type A behavior and anger-control, and it correlated negatively with neuroticism, aggression, anger-state, anger-trait and anger-expression. In addition, the duration of illness (for the patients sample) did not correlate with any of the study factors.

Impact of nutrition education on diabetics adult's knowledge, attitude, practices, and glycemic control in Riyadh city

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Medical nutrition therapy is accepted as an integral part of the care given to patients with type 2 diabetes. Clinical data verify that provision of medical nutrition therapy leads to improve health and is cost saving. Diet is reported to be the largest problem area experienced by individuals with diabetes, and adherence to recommended diets or eating patterns is low.

The aim of the study was to evaluate the impact of nutrition education program on Saudi adult diabetic's knowledge, attitude, practices, as well as their glycemic control.

The study was carried out at King Abdul Aziz University Hospital in Riyadh City. It was conducted in 202 Saudi adult type 2 diabetic patients of both sexes, aged 35 years or more, with duration of diabetes 10 years or less.

The initial assessment was carried out for the sample. Then, the total selected sample was divided into experimental (141 patients) and control group (61 patients). The experimental sample was further divided into two groups according to the implementation of the educational program. The first experimental group attend the five days group education program; a constantly running diabetic education program in the diabetes center. The second group received individual nutrition education program through one counseling session. Patient's dietary knowledge and practices were assessed by using pre- and post-test questionnaire, and beliefs and attitudes of diabetic patients were assessed using the health belief Model (HBM)- a theoretical model highlighting the function of beliefs in decision-making and behavior change.

The studied sample composed of 51% males and 45% females, their mean age was 46.08 ± 7.74 years. The mean duration of diabetes was 4.15 ± 3.11 years.

Evaluation of the impact of the program revealed a significant improvement in the total knowledge, dietary and physical activity practices, perceived benefits of dieting and exercise as well decrease in perceived barriers to dietary management among both experimental group. Comparing health status indicators before and after the program, there was a marked decrease in mean level of FBG, serum TG among diabetic patients in both experimental group. In addition, a decrease in glycated haemoglobin was evident among both males and

females attending group teaching program and also among males of individual teaching program.

Diagnosis of Diabetes Mellitus: A data mining approach

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Objective: An estimation of cut-off points for the diagnosis of diabetes mellitus (DM) based on individual risk factors.

Methods: A subset of the 1991 Oman National Diabetes Survey is used, including all patients with a 2h post glucose load ≥ 200 mg/dl (278 subjects) and a control group of 286 subjects. All subjects previously diagnosed as diabetic and all subjects with missing data values were excluded. The data set was analyzed by use of the SPSS Clementine data mining system. Decision Tree Learners (C5 and CART) and a method for mining association rules (the GRI algorithm) are used. The fasting plasma glucose (FPG), age, sex, family history of diabetes and body mass index (BMI) are input risk factors (independent variables), while diabetes onset (the 2h post glucose load ≥ 200 mg/dl) is the output (dependent variable). All three techniques used were tested by use of cross-validation (89.8%). **Results:** Rules produced for diabetes diagnosis are:

A- GRI algorithm (1) $FPG \geq 108.9$ mg/dl, (2) $FPG \geq 107.1$ and age > 39.5 years.

B- CART decision trees: $FPG \geq 110.7$ mg/dl.

C- The C5 decision tree learner: (1) $FPG \geq 95.5$ and < 106 mg/dl and age > 54 ,

(2) $FPG \geq 106$ and < 133 mg/dl and BMI > 25.2 kg/m².

(3) $FPG \geq 106$ and < 133 mg/dl, BMI < 25.2 kg/m² and age > 36 ,

(4) $FPG \geq 133$ mg/dl.

The three techniques produced rules which cover a significant number of cases (82%), with confidence between 74 and 100%.

Conclusion: Our approach supports the suggestion that the present cut-off value of fasting plasma glucose (126 mg/dl) for the diagnosis of diabetes mellitus needs revision, and the individual risk factors such as age and BMI should be considered in defining the new cut-off value.

The prevalence of complications among a representative sample of diabetic patients in Al-Ain district

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Diabetes mellitus (DM) is a major public health problem in the UAE. A WHO population survey in 1999 reported a prevalence of 24% in local citizens and 17.4% in expatriates. The aim of this study was to determine the prevalence of complications among a representative sample of diabetic

patients in Al-Ain district. **Design:** A Cross-sectional study. **Setting:** Al-Ain Medical District, UAE. Subjects were patients with type 1 and 2 diabetes mellitus of all ages and of both gender. A total of 513 subjects (264 males and 249 females) were selected randomly, interviewed and examined by GPs and diabetologists during the period from October 2002 to May 2003. A specially designed questionnaire was completed and all patients underwent complete physical examination. All patients were referred to ophthalmologists for assessment and fundoscopy. Blood samples were taken to assess fasting blood sugar, HBA1C, renal function tests and fasting lipid profile. Urine samples were obtained and were tested for both macro and microalbuminuria. **Results:** The analysis showed the following results: 19% had Retinopathy and 39% neuropathy. Macroalbuminuria was found in 58% and chronic renal failure in only 1.4%. 12% had peripheral vascular disease, 14% had coronary artery disease and 4% had cerebrovascular disease. **Conclusion:** Diabetes mellitus has serious impact on morbidity and mortality among the UAE population. Much attention for diabetes complications is therefore highly needed in the UAE. A possible area of immediate intervention could be through health education, targeting the prevention and control of the disease complications.

Diabetes complications in Oman: retrospective hospital based study over the last 6 years

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Objective: The aim of the retrospective cross-sectional study is to find out the extent of complications in diabetes amongst patients admitted in hospital. How effective is the therapeutic intervention in terms of benefit and costs. Is there a need to review the protocols of intervention? How consistent are the guidelines followed within the hospital setup? Where are the pitfalls in primary prevention?

Methods: All patients admitted from 1998-03 with diabetes were included ICD coding was used to obtain diagnosis from the medical records. Similar data was collected on patients with cardiovascular, renal, peripheral vascular diseases and strokes with diabetes as controls. Age, sex and gender were included as well as period of hospitalization. **Results:** The method is based on odds ratio analysis of complications in diabetes group as compared to complications without diabetes. There is a trend over the time looked for an increase in macro vasculopathy events. This is obvious in cardiac events, lower limb amputations and strokes. In addition the renal dialysis has increased in demand complicated further by fatal cardiac events. The prevalence of retinopathy requires additional quantification due to probable bias. Since not all patients are having retinal check-ups when under different specialty other than endocrine. **Conclusion:** There is a definite trend of increasing diabetes complications within the hospital setup. The numbers of referrals to tertiary care are

greater. The problems accounting to these are multifactorial. Indicators relate to poor glycemic control at all level, unawareness or failure of treating physician to abide by the guidelines. The situation is compounded further by logistics and administrative limitations. There is an affirmative need to re-evaluate the whole system.

Lung function in Saudi diabetic patients

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Objectives: Our aim was to study the effects of diabetes mellitus on lung functions and to determine its severity in relation to duration of the disease. **Methods:** In this study, a group of 47 apparently healthy volunteer male diabetic patients were randomly selected with age ranging from 20-70 years. The diabetic patients were matched with another group of 50, healthy male control subjects in terms of age, height, weight and socioeconomic status. Both groups meet with exclusion criteria as per standard. Spirometry was performed on an electronic spirometer (Compact Vitalograph) and results were compared by a paired t-test. **Results:** Diabetic patients showed a significant reduction in the Forced Vital Capacity (FVC), Forced Expiratory Volume in First Second (FEV1) and Peak Expiratory Flow (PEF) relative to their matched controls. However, there were no significant difference in the Forced Expiratory Ratio (FEV₁ / FVC %) and middle half of the FVC (FEF_{25-75%}) between the groups. **Conclusion:** We conclude that lung functions in diabetic patients are impaired, by a decrease in FVC, FEV₁ and PEF and stratification of results by years of disease shows a dose-response effect of duration of disease on lung function. This effect primarily shows a restrictive pattern of airways disease.

Incidence of childhood Type 1 diabetes in Kuwait

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Aims: To provide age-gender standardized incidence rate, temporal trend and seasonal variation of type 1 diabetes in Kuwaiti children ≤14 years to compare incidence of childhood type 1 diabetes between Arab countries **Methods:** Data were prospectively collected over a period of 6 years (1992-1997) according to the DiaMond Project protocol using the capture-recapture method of ascertainment. **Results:** Data ascertainment varied between 90% and 96%. The incidence rate of Type 1 diabetes was 20.1 per 100.000 children 0-14 years (95% confidence interval (CI) 18.0-22.1); age-standardized incidence rate was 20.9 (95% CI 18.8-23). The incidence rate among boys, 21.1 per 100 000 (95% CI 18.1-24.1) was slightly higher than that among girls, 19.0 per 100 000 (95% CI 16.1-21.8). The age-standardized incidence rate was 21.9 (95% CI 18.9-24.8) in boys, and 19.9(95% CI 17.1-22.8) in girls. Incidence rates increased with age in both sexes

(boys, $P < 0.001$; and for girls $P < 0.0001$). There was significant trend towards increase in overall incidence during the 6-year period ($P = 0.013$), and in age group 5-9 ($P = 0.0001$) Seasonality was demonstrated overall, in boys and girls ($P < 0.001$) **Conclusion:** The incidence of type 1 diabetes in Kuwait is high compared with neighboring Arab countries, and appears to be increasing as in many European populations.

Prevalence of the metabolic syndrome and associated cardiovascular risk factors, LDL-C, HDL-C & Microalbuminuria in patients with Type 2 diabetes

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Background and aims: Conventional risk factors such as plasma lipids and hypertension only partly account for the excess risk of developing cardiovascular disease in type 2 diabetes mellitus (T2D). Recent evidences suggest that conditions associated with T2D, such as insulin resistance (IR), may also play a role in "regulating" cardiovascular risk factors. IR seems to be an underlying pathogenic factor in the development of the metabolic syndrome (MS). We assessed the association of MS based on definition of NCEP-ATP III with non-traditional cardiovascular risk factors in patients with T2D. **Materials and methods:** The sample comprises 84 patients (age 57.3 ± 7 yrs; 59% women (W), 41% men (M); diabetes duration 11 ± 10 yrs). As detailed in the ATP III report, participants having 3 or more of the criteria were defined as having the MS. Glycated hemoglobin A1c (HbA1c), total, LDL and HDL cholesterol, uric acid, and urinary albumin/creatinine ratio (UA/b/Cr) were measured. **Results:** The prevalence of the MS in men and women was 69.4% and 93.7% respectively. The prevalence increased from 21% before 40 years of age to 70% after 70 years. Diabetes duration was not different in patients with MS than those without MS (M: 10.5 ± 10 vs 11 ± 2 ; F: 11.5 ± 9 vs 10.0 ± 7 yrs). The number of components of the MS was related to age ($p < 0.05$) but not to diabetes duration. The prevalence of central obesity was 62% in men and 93% in women; hypertension 68% and 76%; low HDL-C 24% and 29% and high triglycerides were 43% and 49%, respectively. The levels of A1c was increased in men with MS (7.8 ± 1.3 vs 7.3 ± 1.2 %, $p < 0.01$), while uric acid (F: 5.5 ± 1.3 vs 3.9 ± 4.1 mg/dl, $p < 0.0001$; M: 5.8 ± 1.3 vs 5.3 ± 2.3 mg/dl, $p < 0.001$) and non-HDL-C (F: 169 ± 35 vs 148 ± 33 mg/dl, $p < 0.01$; M: 168 ± 37 vs 155 ± 35 , $p < 0.001$) was higher both in men and women with MS. No difference was observed for LDL-C concentrations. The rate of microalbuminuria increased significantly in both men and women in the presence of none (12% vs 1.3%), one (12% vs 2.7%), two (21% vs 39%), three (27% vs 34%) or four (23% vs 25%) components of the MS. **Conclusion:** These results show that the MS is highly prevalent in type 2 diabetes. The levels of novel cardiovascular risk factors are increased in diabetics with MS and may identify a subgroup at high risk. The development of comprehensive efforts directed

at controlling the components (mainly obesity) of MS are urgently needed in type 2 diabetes.

Pattern of diabetic admission in Al-Gamhouria teaching Hospital, Aden Yemen, 1998-2000

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Background: Diabetes mellitus is emerging as a problem of major public health concern, and this is believed to result from socioeconomic development and urbanization with the associated life style changes. Twenty years ago, diabetes was considered an uncommon disease with an adult prevalence of 1-3% in European and North American populations and much rarer in developing countries. **Objective:** To describe the pattern of admitted diabetic cases in AL-Gamhoria Teaching Hospital during 1998-2000 and to identify the main causes of diabetic morbidity and mortality. **Methodology:** Through a retrospective approach, we analyzed 650 medical records of admitted diabetic cases in the medical words of AL-Gamhoria Teaching Hospital in Aden during 1998-2000. Variables retrieved were age, sex, residency, cause of admission, diagnosis at discharge and causes of death. **Result:** Through the study period, the total number of admitted diabetic cases was 650 patients distributed as follows: 1998:180 (27.7%), 1999:184 (28.3%), and 2000:286 (44%). The mean age of patients was 53 ± 2.3 years, and the percentage of admitted cases increases as the age become more advanced up to the age 60-69 years. The majority of cases (75.7%) were from Aden governorate. Diabetes mellitus alone is the cause of admission in 30.5% of cases and was responsible for 10.9% of deaths during the study period. The most frequent complications were mainly arterial hypertension, and congestive cardiac failure, whereas cerebrovascular accident, renal failure and arterial hypertension were the most frequent causes of death. **Conclusions and recommendations:** Diabetes mellitus is an important cause of morbidity and mortality in the studied hospital. Therefore, health education and counseling are important measures to control the course of the disease. The study also recommends the establishment of diabetes mellitus unit in the hospital and the improvement of medical records.

Prevalence of diabetes and its risk factors in urban government officials

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Background: Globally diabetes is on rise and highest among Indians, with 20 million diabetics and the expected rise up to 2025 is 57 million with 195% rise. The prevalence of diabetes in India is 10-15%. **Objective:** The study was done to know the prevalence of diabetes and its risk factors in urban government officials. **Method:** Study design: Cross sectional study. Setting: Sachivalaya of Gandhinagar city, Gujarat,

India. Sample size: 590. A pre-tested semi structured proforma administered to the participants. Investigation was done for diagnosing diabetes using FBS & PP2BS. **Results:** Prevalence of diabetes was highest (19%) in class - I cadre and lowest (8.2%) in lowermost cadres. Overall prevalence rate of diabetes among study population was 13.4% with higher rate in males (13.7%) than females (11.1%). The association between WHR and diabetes prevalence among male employees was statistically significant among all cadres except cadre II. Prevalence rate of diabetes in low-income group was found to be 10.60 %, in middle-income group to be 14.69 % and in high-income group to be 15.04 %. The family history was positive in 49.36% among diabetic compare to 17.61% among non-diabetic and the difference was statistically significant. The prevalence of hypertension was 48.1% in diabetic compare to 30.7% in non-diabetics and the association between hypertension and diabetes was statistically significant. **Conclusion:** Overall prevalence of diabetes is high overall, particularly in males. High-income group, positive family history, hypertension, BMI and sedentary life style were contributing factors.

Consanguinity protects against diabetes mellitus

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Introduction: Consanguineous marriages increase probability of allele homozygosity and, theoretically, may alter the risk of genetically determined diseases. Diabetes is a polygenic disease and consanguinity rates in the Middle East countries are high. We examined whether being of consanguineous parentage affects the risk of diabetes mellitus. **Method:** Study subjects were part of a case-control cancer study comprising 614 cancer patients who entered Tawam Hospital for treatment and 397 non-cancerous age and sex matched and randomly selected individuals from the 1995 census sample of UAE citizens. Data on cancer patients and non-cancerous individuals were combined to increase power of the study. **Results:** Over 36-month period, 1011 UAE citizens were asked whether they have diabetes mellitus and whether their parents were consanguineous. One hundred and seven subjects were excluded from analysis due to lack of data on diabetes (19 subjects) or on parental consanguinity (78 subjects). Mean age of the group was 48.3 years (range, 1-95) and female to male sex ratio was 1.36. Among 314 subjects with consanguineous parents, 51 had diabetes (16.2%). Among 590 subjects with non-consanguineous parents, 131 had diabetes (22.2%). The odds ratio for diabetes in consanguineous group compared to non-consanguineous group was 0.68 (0.48 - 0.96). Parental consanguinity reduced relative risk of diabetes by 27% (range, 4 – 45). **Conclusion:** Parental consanguinity is protective against diabetes mellitus.

The Prevalence Of Erythropoietin Deficiency And Associated Determinants In Patients With Type 2 Diabetes

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Background: Anaemia, a key complication of chronic kidney disease (CKD), occurs early in the course of diabetic kidney disease and has been shown to be more prevalent than previously realized. Low serum erythropoietin (Epo) is known to be a key causal factor in the anemia of diabetic patients, yet patients are rarely screened for erythropoietin deficiency. The aim of this study was to investigate the prevalence of erythropoietin deficiency and associated determinants in patients with type 2 diabetes. **Patients And Methods:** We measured plasma erythropoietin (Epo), ferritin and complete blood count in 161 type 2 diabetic patients (93 females and 68 males, mean (95% Confidence Interval (CI)) age: 58.85 (\pm 10.76), diabetes duration: 12.3 (\pm 8.14) yrs. Serum creatinine and calculated creatinine clearance (Modification of Diet in Renal Disease (MDRD) formula) were used as markers of glomerular filtration rate and urine microalbumin: creatinine ratio was determined to classify patients as normo-, micro- or macro-albuminuric. Patients were also assessed for peripheral sensory neuropathy. **Results:** 21 (13.04 %) patients were anemic; 80 patients (49.68%) had Epo deficiency (Epo < 5 mU/ml). Among these patients with Epo < 5 mU/ml, 27 (33.75%) had GFR < 60 ml/min/1.73m²; 36 (45.00%) were normoalbuminuric, 25 (31.25%) were microalbuminuric and 9 (11.25%) macroalbuminuric. 18 of 27 patients (66.66%) with peripheral sensory neuropathy (PSN) had Epo < 5 mU/ml but there was no significant difference in Epo between patients with and without PSN. Log Epo was significantly correlated with urine microalbumin: creatinine ratio ($r = -0.18$; $p = 0.04$) and logistic regression analysis showed that Epo deficiency was associated with urine microalbumin: creatinine ratio (OR 2.27, 95% CI 1.25 – 4.10, $p = 0.007$). Epo was significantly higher ($p < 0.0001$) in anemic patients compared to non-anemic patients but ferritin was not significantly lower ($p = 0.56$). **Conclusion:** Epo deficiency is common in diabetic patients with and without anemia. Early screening with determination of serum Epo is recommended in order to allow patients to benefit from timely intervention and thus prevent the deleterious consequences of anaemia.

Continuous Subcutaneous Insulin Infusion in Type 1 Diabetic Saudi Children: A Comparison with Conventional Insulin Therapy

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Objective: To assess the efficacy and effectiveness of continuous subcutaneous insulin infusion (CSII) therapy in type 1 diabetic Saudi children in comparison with conventional insulin (CI) therapy. **Methods:** CSII was initiated in 14 Saudi children with type 1 diabetes mellitus through insulin pump therapy between October 2002 and June

2004. All children were followed at the Diabetes Clinic at King Faisal Specialist Hospital and Research Center. The patients were initially on CI therapy, which is usually defined as 2 or fewer insulin injections per day before shifting them to CSII. The patients were trained on carbohydrates counting and started on continuous basal insulin infusion in addition to meal and high blood glucose correction insulin boluses.

Results: The patients included in the study had type 1 diabetes mellitus for a mean duration of 6 years. The age of the children ranged from 4 to 18 years. They were followed on insulin pump therapy for a mean duration of 10 months. There was a significant reduction in HbA_{1c}, mean blood glucose level, total insulin requirement, frequency of hypoglycemic episodes and frequency of diabetic ketoacidosis (DKA) events during CSII therapy. **Conclusion:** CSII improved the glycemic control in diabetic Saudi children with decreased frequency of hypoglycemic episodes and DKA events.

A case of Type-1 diabetes, Marfan Syndrome & unilateral testicular agenesis: A new syndrome

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Marfan Syndrome is a hereditary connective tissue disorder due to abnormalities of fibrillin encoded in chromosome 15. It is very rarely associated with Type-1 diabetes. We describe a case of a 14 year old Sudanese patient who was diagnosed with Type-1 diabetes 10 month earlier and was seen for assessment of diabetes control. He was noted to be quite tall for his age (171 cm), with span exceeding height (173), has gross arachnodactyly, high arched palate, hypermobile joints, mild kyphoscoliosis but no cardiovascular abnormalities. Slit lamp examination didn't show ectopia lentis and he was found incidentally found to have L sided absent testicle, but well developed R testicles and he had well developed secondary sex characters. . Abdominal and pelvic ultrasonography didn't show any ectopic testis, and laparoscopic exploration didn't show any testis in the abdomen, pelvis or the inguinal canal, but he had well developed gubernaculum. Several members of his family are very tall. This case displays unusual association of Type-1 diabetes with Marfan Syndrome which will have implication on future management of the patient primarily from amplification of vascular event. Furthermore the association of testicular agenesis with the two conditions may represent a new syndrome.

Study Of The Effect Of Cooked Beans As A Popular Meal On Blood Glucose And Insulin Levels In Diabetics: The Value Of Addition Of Oil

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Background: For several years, the hypothesis of Burkitt and Trowell has stimulated a great deal of interest in dietary fibre, its physiological effects and its possible role in prevention and management of diabetes mellitus. Moreover, Karlestrom et al, 1987 reported that a moderate amount of leguminous seeds in the diabetic diet resulted in improved diabetic control in type two diabetic patients compared with a control diet with the same contents of energy, protein, fat and carbohydrate.

Objectives: To determine the effect of cooked beans as a popular Egyptian breakfast on the blood glucose and insulin level in DM type 2 patients before and after addition of corn oil. Also the effect of addition of proctofibe to that Egyptian meal. **Methods:** This work was carried in 3 groups each of 10 patients:

Group I of Type 2 diabetic patients was given cooked beans and cooked beans with oil.

Group II of type 2 diabetic patients was given cooked beans and cooked beans with fibre.

Group III of control subjects was given cooked beans and cooked beans with oil. **Results:** In group I (DM type 2 patients receiving cooked beans and corn oil): Non significant change in the percent increment rise of blood glucose and plasma insulin before and after addition of corn oil denoting that oil has no effect on the blood glucose nor plasma insulin, in contrast the plasma cholesterol improved level in these diabetic patients. In group II (DM type 2 patients receiving cooked beans and effect of addition of proctofibre): There was significant reduction in blood glucose and insulin level at 2 points (60, 90 minutes). In group III (Control subjects receiving cooked beans and corn oil): There was significant rise in the percent increment changes of blood glucose and insulin level at 120, 180 minutes after addition of corn oil .

Addition of corn oil which is formed from poly-unsaturated fatty acids to a meal of a non insulin dependent diabetic patient is not harmful and did not alter the plasma glucose and insulin level, in contrast, it is very beneficial since it decreases the plasma cholesterol level, delaying atherosclerosis.

Conclusion: Acute addition of high fibre diet (proctofibe) to the complex carbohydrate diet resulted in a significant decrease in the mean increment rise of blood glucose and insulin level. This is very important in the regulation of diabetic diet. The use of small amount of supplemented fibre in the present study has resulted in significant improvement in glucose tolerance in diabetic patients. The amount used is convenient to take and could be mixed with other foods. In order to be of clinical help, our results must be observed after chronic ingestion.

Changes in Blood Sugar before, during and after Ramadan

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Blood sugar management is very challenging for the professionals as well as the patients during the holy month of Ramadan, due to cultural, social and religious practices of the people it becomes more difficult. Also due to the nature of fasting done by the Muslims during Ramadan not eating from sunrise to sunset, managing the blood sugar is very erratic especially with the fear of hypoglycemia's. The main objective of our study is to look into the blood sugar pattern of our diabetic patients both type 1 and type 2 during the month of Ramadan using CGMS machine (Continuous Glucose Monitoring System) to evaluate the Ramadan protocol for insulin adjustments. CGMS machine will give continuous blood glucose monitoring for more than 288 readings per day it has been an excellent tool to study this variation. 29 Type 1 diabetic patients & 29 type 2 diabetic patients were selected randomly from the clinics. The type 2 group was further divided into 6 groups: Insulin treated, intensive insulin, insulin & oral hypoglycemic, multiple hypoglycemic agents, single oral hypoglycemic agents and diet only. CGMS machine was fixed to each patient for a period of three days during the month of Shaban, first half of Ramadan and in Shawwal. Data were collected electronically and the episode of hypo and hyperglycemic were studied. The complete data will be presented.

Serum Resistin is associated with C - reactive protein & LDL cholesterol in Type 2 Diabetes and Coronary Artery disease in a Saudi population

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Aims: Resistin is an adipocyte-derived factor implicated in obesity associated type 2 diabetes. This study examined the association between human serum resistin, type 2 diabetes and coronary heart disease. **Methods:** One hundred and fourteen Saudi Arabian patients (male/female (46/68) Age 51.4 (11.7)/45.59(11.7) years [mean (SD)] and BMI 27.1(8.1)/ 30.3 Kgm² (6.3) were studied. Serum resistin and CRP levels were measured in all subjects. (35 patients had type 2 diabetes mellitus (T2DM); 24 patients had coronary heart disease (CHD). **Results:** Serum resistin levels were higher by 1.2 fold in type 2 diabetes and 1.3 fold in CHD than controls (p value = 0.01). In addition C-reactive protein, a marker of inflammation, was significantly increased in both T2DM and CHD patients (p-value = 0.007 and 0.002 respectively). The use of regression analysis, also determined that serum resistin correlated with CRP levels (p value 0.04 R² 0.045). **Conclusions:** The findings from this study further implicate resistin as circulating protein associated with Type 2 diabetes

and CHD. In addition this study also demonstrates an association between resistin and CRP, a marker of inflammation in type 2 diabetic patients.

Hypertension and Diabetes Mellitus: How applicable are the new British Hypertension Society guidelines?

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Diabetes mellitus (DM) is a global health problem as its prevalence in five years time is estimated to be double the prevalence in 1995. Furthermore, DM is a chronic disease associated with a high rate of macro & microvascular complications. Consequently, DM consumes 9% of the UK health budget. This is currently estimated at £4.9 (\$8.5) billion/year. The prevalence of hypertension in DM is twice that in non-diabetics. Indeed, the association of hypertension in DM leads to a high rate of macro & microvascular complications.

Over the last two decades numerous clinical studies provided a mountain of evidence indicating that tighter control of diabetes and its complications can reduce the burden of this condition. However, studies indicate that the majority of people with DM are not achieving the recommended treatment targets. Indeed, this was our audit observation for T2D treated in their local hospital diabetes clinics in various regions in England and Wales (1998-2002). In these audits, over 50% of the patients had a blood pressure over 140/80 although antihypertensive treatments were prescribed to 80%. Furthermore, MVD was diagnosed in 45% of the audit population. Many other national surveys showed a substantial suboptimal blood pressure control in the UK.

The importance of achieving better treatment targets for DM and its complications has been strongly stressed by the UK National Service Framework (NSF) for diabetes. This has been also echoed by the British Hypertension Society (BHS) guidelines, which have recently updated (2004). The objective of these recent guidelines is to improve the management of hypertension and to reduce and indeed prevent both macrovascular and microvascular complications in high-risk groups such as diabetics. The guidelines, through applying evidence-based medicine, also aim at providing simple answers to many un-answered questions in the management of hypertension in DM such as:

The treatment threshold for hypertension

The role of ambulatory and home BP monitoring

The treatment target for BP

The role of life style measures

The specific indications/contraindications of various anti-hypertensives

A treatment algorithm

The role of statins and a target cholesterol level

The role of aspirin

However, the applicability of these guidelines in the UK as well as its potential applicability to other countries needs to be discussed.

Hypertension Control in Diabetes Patients in Kuwait

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Background: Hypertension is a known cardiovascular risk factor in both diabetic and non-diabetic patients, and uncontrolled hypertension, is highly prevalent among hypertensive patients particularly diabetics. **Objective:** To study the prevalence of hypertension in the diabetic Kuwaiti population and rate of control, and factors which affect hypertension control in these patients. **Patients and methods:** A population-based study of a total of 251 diabetic patients (T1DM and T2DM) being followed up in diabetes out patient clinic at Alamiri Hospital, were evaluated for the presence or absence of hypertension. In addition to the routine biophysical data (that includes blood pressure fundus examination), we measured the glycated hemoglobin, lipid and renal profile, urinary microalbumin and total urine protein excretion. **Results:** Of the 251 patients, 142 (56.6%) were having uncontrolled hypertension. Factors associated with uncontrolled hypertension were old age ($p = 0.0$), being T2DM ($p = 0.0$), longer duration of DM ($p = 0.001$), obesity ($p = 0.00$), having past history of hypertension ($p = 0.0$), and having proteinuria ($p = 0.01$). Uncontrolled diabetes with high HbA1c was not significantly related to uncontrolled hypertension that also applies to the presence of dyslipidemia, retinopathy, coronary heart disease and the type of antidiabetic treatment. **Conclusion:** We conclude that the majority of the diabetic patients are having uncontrolled hypertension, and, beside aggressive antihypertension pharmacotherapy, other factors related to hypertension like obesity and nephropathy should be managed and tightly treated which could have positive impact on hypertension control.

Optimal control of blood pressure in patients with type 2 Diabetes mellitus in Fujairah Hospital

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Introduction: Hypertension is a common complication of diabetes mellitus, mainly type 2 DM. Diabetologists and physicians taking care of diabetic patients worldwide are trying to keep blood pressure within the optimal control range recommended by (WHO) and (ADA) i.e. BP \leq 130/80. **Methods and Results:** This prospective study was performed at Diabetes Clinic-Fujairah Hospital during the period May 8 to June 23, 2004. 81 patients with type 2 DM and hypertension were studied. They were 61 females and 20 males. Most of the patients (97.5%) were above 40 years of

age and only 2.5% were under 40 years. 71 patients were UAE nationals and 10 were non-national. BP was checked using the same automatic sphygmomanometer with the patients sitting after 15 minutes rest. BP readings from the left arm showed that BP was controlled and within the optimal range in only 37 (45.6%) patients whereas the remaining 44 (54.4%) had un-controlled BP. Nearly half of the patients (48.1%) were on monotherapy, 37 patients were on 2 or 3 antihypertensive drugs (23.4 and 22.3%, respectively). Only 3.7% of the patients were on 4 medications whereas the remaining 2.5% were on no medications. The most frequently used medications in the group studied were ACE inhibitors (69.1%) followed by Beta Blockers (46.9%), Diuretics (34.5%), calcium channel blockers (14.8%) and ARB in the remaining 8.6% of the patients studied. **Discussion:** Studies in the optimal control BP in non-diabetic hypertensive patients showed that only (21%) of them in USA and (8%) in UK had their BP within optimal range. A national study in U.A.E showed that nearly 25% of the hypertensive patients are achieving the optimal control of their BP. The present pilot study showed that 45.6% of the patients studied were achieving the optimal control of their BP. Although the number of patients studied was only 81, it still showed that a good percentage of them were achieving the optimal control of their BP, However further studies are needed to confirm this finding.

Audit Report conducted at the Diabetes Unit at Rashid Hospital in Dubai, UAE.

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To determine the percentage of diabetic patients (type 1 and type 2) who have had their albumin:creatinine ratio measured between January 2001 and January 2002 at the Diabetes Unit of Rashid Hospital, Dubai, United Arab Emirates. **Background:** Microalbuminuria is the earliest indicator of renal disease attributable to diabetes. A review of longitudinal studies has shown microalbuminuria to be predictive of total mortality, cardiovascular mortality and morbidity and end-stage renal failure (ESRF). **Objective:** To determine whether services provided at the diabetes unit of Rashid Hospital compare with national guidelines with regards to screening for diabetic nephropathy. **Methodology:** Data was collected retrospectively from 150 medical case records that were randomly selected between January 2001 and January 2002 of the diabetic patients attending the diabetes unit of Rashid Hospital. **Results:** 150 cases were reviewed, of which 99 patients (53 females and 46 males) had their albumin: creatinine ratio measured between January 2001 and January 2002. **Conclusion:** The standard for microalbuminuria testing was set at 85 % as this was the first audit process for the diabetes unit of Rashid Hospital. The results of the audit translated to just 66 %. Several factors were identified which contributed to the lower figure.

Prevalence of Metabolic Syndrome in Moroccan Women

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Objective: The goal of this work was to examine the prevalence and associated risk factors of undiagnosed diabetes among urban Moroccan Sahraoui women. **Methods:** Data were collected from a randomised sample of adult women aged 15 and older, non-pregnant who visited the Public Health Centres during immunization campaign of Laayoune city of South Morocco. Only subjects identified as of Sahraoui origin were eligible for this investigation. Body weight, height, circumferences of waist (WC) and hip, blood pressure, fasting plasma glucose (FPG), triglycerides (TG), dietary intake and physical activity were collected. **Results:** The prevalence of undiagnosed diabetes was 6.4% of women. Obesity, hypertension, hypertriglyceridemia and familial history of diabetes were more common among diabetic women than those with normal glycaemia. Similarly, means of age, BMI, WC, WHR (waist/hip ratio), sucrose intakes, plasma (TG), systolic and diastolic pressure were higher in diabetic women than in those with normal glycaemia. The physical activity estimated by the time spent in walking was negatively associated with (FPG). Also, regression analyses show that age, obesity, family history of diabetes and (TG) were independently associated with diabetes. **Conclusion:** The high proportion of unknown diabetes suggests a need for increased diabetes awareness in this population. The data suggest also the involvement of obesity in diabetes and the potential importance for intervention strategies to reduce population adiposity for the prevention and management of cardiovascular risk factors.

Assessment of hypertension in diabetic patients under follow up at Moosabne Jafar hospital in Ghochan-Iran

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Introduction & Objectives: Nephropathy affects diabetic patient and antihypertensive treatment has been shown to retard its progression. Hypertension should be treated aggressively in diabetic patient particularly if there is evidence of renal disease. This report focuses specially on the assessment of BP and management of hypertension in diabetic patient. **Methods:** This is a retrospective study to assess hypertension in diabetic patient. Data Collection is done from 100 client documents which were referred to Moosabne Jafar hospital with the diagnosis of type 2 diabetes. In this study BP (> 140 / 90) or usage of antihypertensive drugs was equivalent to hypertension. **Results:** 70% had hypertension. Mean of age, FBS and BP at the first and last day of residence was 62/9 years, 270/8mg/dl and 167/5 mg/dl, 129/77 and 120/75

mmHg. 50% of patient used ACE agent and 30% used adalat and lasix. Most of the patients complained of at least one of these problems: CVA, IHD, DVT, CRF, CHF, Chest pain, and paresthesia. **Discussion & conclusion:** Hypertension in diabetic patient is associated with accelerated progression of both micro vascular (retinopathy and nephropathy) and macro vascular (arteriosclerosis) complication. Diabetic nephropathy is now the leading cause of ESRD and medical treatment has been shown to retard its progression. The aim of blood pressure reduction includes retardation of progression and prevention of diabetic complication.

Experimental diabetic nephropathy - evidence for multiple apoptotic pathways

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The aim of this study is to investigate the morphological and biochemical apoptotic changes that occur at 1 and 8 months after induction of diabetes by streptozotocin. We also investigated the specific role of apoptosis-regulatory genes in diabetic nephropathy.

Diabetes was induced by a single intraperitoneal injection of streptozotocin (60 mg/kg body weight). Tissues from diabetic (n= 15 each) and control (n= 15 each) rats were analyzed after 1 and 8 months of treatment. Electron microscopy showed basement membrane thickening, loss of podocytic foot processes, disruption of tubular basal infoldings and their related mitochondria 8 months after induction of diabetes. Biochemical results showed activation of the effector caspase, caspase-3 and cleavage of its natural substrate PARP, a DNA repair enzyme, indicating activation of apoptotic cascades in diabetic kidney cells. Furthermore, cytochrome-c released from mitochondria of diabetic kidney cells into the cytoplasm, indicating disruption of mitochondrial outer membrane, strongly suggests involvement of cytochrome-c mediated activation of apoptotic pathway in these cells. Interestingly, the level of expression of p53 was substantially increased in diabetic kidney cell lysates. p53 is known to induce cytochrome-c mediated activation of caspase-3. We also observed changes in the level of anti-apoptotic protein Bcl-2 in diabetic kidney mitochondrial fractions. The electron microscopic results suggest that extensive damage and loss of kidney tissue might be partly responsible for the clinical presentation of diabetic nephropathy. The ultrastructural changes in the tubules seem to implicate apoptosis in the pathology of diabetic nephropathy. Moreover, the observed increase in cytosolic cytochrome-c, activation of caspase-3, cleavage of PARP and changes in the expression levels of Bcl-2 and p53 in diabetic kidney cells indicate involvement of a mitochondrial pathway in triggering apoptosis in diabetic nephropathy.

Determinants and Associations of Plasma Homocysteine in Patients with Type 2 Diabetes Mellitus.

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Objective: The relationship between hyperhomocysteinemia and CHD in diabetic patients is controversial. Plasma homocysteine (tHcy) levels are lowered by acute hyperinsulinemia in non-diabetic but not in type 2 insulin resistant diabetic individuals, while diabetic nephropathy (DN) is usually associated with elevated tHcy. This study evaluates the relationship of fasting plasma tHcy levels with insulin resistance (IR) index (product of the fasting plasma insulin (in uU/mL) and glucose (mmol/L) divided by 22.5) and renal function in 101 Kuwaiti patients with type 2 diabetes with a wide range of DN. **Methods:** Fasting plasma tHcy (Abbott IMx), serum insulin (ELISA), glucose and lipid profile (Beckman LX20) and HbA_{1c} (Beckman CX7) were determined. GFR was assessed with estimation of serum Cystatin C and creatinine. Patients were classified as normo-, micro- or macro-albuminuric. Regression analyses were used to relate tHcy with the degree of DN, markers of GFR and IR index. **Results:** Plasma tHcy was significantly higher in male patients than female patients ($p = 0.03$) but the IR index was not ($p = 0.45$). Plasma tHcy levels were significantly higher in patients with microalbuminuria than in those without (mean (SD) 14.46 (5.89) v 11.98 (4.41) $\mu\text{mol/L}$, $p = 0.02$). Plasma tHcy showed increasing concentration with increasing degree of microalbuminuria (p for trend < 0.0001). On Spearman rank regression analysis, plasma tHcy correlated significantly with indices of GFR (serum creatinine $r = 0.58$; $p < 0.0001$) and serum cystatin C $r = 0.33$; $p < 0.0001$). Partial correlation analysis correcting for age and sex showed that plasma tHcy was significantly correlated with IR index ($p = 0.04$) as well as urine albumin: creatinine ratio ($p = 0.004$). **Conclusion:** The degree of DN as well as IR are determinants of plasma tHcy in patients with type 2 diabetes. Increased tHcy may explain, in part, the link between DN and increased risk of CHD. Differences in published data may be due to varying degrees of IR and DN in the populations studied.

Associations of markers of systemic inflammation in patients with Type 2 diabetes mellitus.

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Background: The risk of cardiovascular disease in patients with diabetes is in excess of what would be expected when traditional coronary heart disease (CHD) risk factors are taken into consideration. Recent evidence suggests that atherosclerosis is a chronic inflammatory state indicating that the assessment of markers of systemic inflammation, such as C-reactive protein (CRP) and interleukin 6 (IL6), could be used to identify persons at high risk of CHD. To test whether CHD risk factors are associated with increased circulating

concentrations of CRP and IL6, this study evaluates their relationship with traditional and non-traditional CHD risk factors in patients with type 2 diabetes mellitus with CHD and appropriate type 2 diabetic controls without CHD. **Methods:** The concentrations of CRP (determined by a high-sensitivity assay) - hsCRP, interleukin-6 (IL-6), total plasma homocysteine (tHcy), lipoprotein (a) [Lp(a)] and sialic acid (SA) were determined in 56 type 2 diabetic patients with CHD and 52 age- and sex-matched type 2 diabetic controls without CHD. Multivariate regression analysis was used to relate these markers with traditional CHD risk factors (such as age, sex, body mass index, serum lipids, smoking and hypertension) as well as non traditional risk factors such as CRP, IL6, tHcy, SA and Lp(a). Logistic regression analysis was used to study the association of traditional and non-traditional risk factors and CHD **Results:** CRP was not normally distributed in the patients and controls even after log-transformation. The CRP ($p = 0.02$) and tHcy ($p = 0.03$) concentrations were significantly higher in the patients with CHD compared with the control group and these differences remained statistically significant after correction for age and sex. IL6, TC, TG, HDL-C, LDL-C, apo B, SA and Lp(a) were not significantly different between the two groups of patients. When the patients were stratified according to the quintiles of CRP, IL6, SA, tHcy, and Lp(a) concentrations, the percentage of individuals in the highest quintile of CRP was almost four-fold higher in the diabetic patients with CHD (28.9%) relative to those without CHD (8.1%) ($p = 0.01$) whereas no significant differences were observed in the highest quintiles of IL6 ($p = 0.20$), SA ($p = 0.32$); and Lp(a) ($p = 0.18$). After adjustment for potential confounders the odds ratio (OR) for elevated CRP was 2.00 (95% confidence interval [CI], 1.12 to 3.58) ($p = 0.02$) but the OR for IL6 was 3.41 95% CI, 0.70 to 17.17 ($p = 0.14$). Partial correlation analyses of CRP and IL6 with other variables after controlling for age and sex showed significant correlation of CRP with tHcy, and SA in patients with CHD only. IL6 values were statistically significantly higher with increasing urine albumin excretion ($p < 0.05$) but, although, there was a trend towards increasing CRP values with increasing degree of albuminuria, the urine albumin excretion did not significantly influence CRP concentration.

Conclusion: This study shows that some traditional and non-traditional risk factors in type 2 diabetic patients were not significantly associated with CHD when corrections are made for age and sex whereas CRP is strongly associated with CHD. Our results support the inclusion of CRP, determined by a high sensitivity assay, in the risk assessment of diabetic subjects. Patients with levels associated with increased risk should be managed aggressively to prevent the development or progression of CHD.

Clinical Utility of Cystatin C And Beta-2 Microglobulin In Patients With Type 2 Diabetes Mellitus.

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Background: Despite recent studies showing that serum cystatin C (CC) is a better marker for GFR than the ubiquitously used serum creatinine, its clinical utility remains under evaluation. **Methods:** To evaluate the clinical usefulness in patients with Type 2 diabetes mellitus (DM), serum concentrations of cystatin C (CC), beta-2-microglobulin (B2M) and creatinine were measured in 105 (38 males, 67 females) patients with type 2 diabetes mellitus (DM). The results were compared with creatinine clearance (Ccr) which was measured and also estimated with the Cockcroft-Gault formula and correlated with 24h urine protein and early morning urine albumin: creatinine excretion ratio. **Results:** Serum CC showed significant correlation with serum creatinine ($r = 0.77$, $p < 0.0001$) and B2M ($r = 0.82$, $p < 0.0001$). The serum CC concentration inversely correlated more closely with Ccr ($r = -0.46$, $p < 0.0001$) than serum B2M ($r = -0.44$, $p < 0.0001$). In patients with mildly impaired renal function (Ccr 60-80 ml/min), a significant increase in CC and B2M concentration was observed in 20% of patients. In patients with normal Ccr increased CC and B2M concentration was observed in 16% and 24% of patients respectively whereas no patient had increased serum creatinine. In patients with hyperfiltration (Ccr \geq 140 ml/min), decreased CC and B2M concentrations was observed in 21% of patients, whereas no patient had decreased serum creatinine. The sensitivities for detection of Ccr $<$ 60 mL/min were: CC 86%; B2M 79% and serum creatinine 33%. CC ($p < 0.0001$) but not B2M ($p = 0.49$) was significantly higher in patients with microalbuminuria. Estimation of CC (US\$2.40 per test) and B2M (US\$1.9 per test) are more expensive than that of serum creatinine (US\$0.30 per test). **Conclusion:** These data suggest that CC and B2M are better markers of GFR than serum creatinine in patients with type 2 DM. However, B2M is known to be affected by cellular proliferation. CC measurement may offer improved sensitivity for detection of changes in GFR during the development and progression of diabetic nephropathy.

Postprandial Hyperglycemia a Significant Risk Factor for Coronary Heart Disease

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Background: The highest concentrations of blood glucose during the day are usually found postprandially. Postprandial hyperglycemia (PPH) is likely to promote or aggravate fasting hyperglycemia. Evidence in recent years suggests that PPH may play an important role in functional & structural disturbance in different body organs particularly the CVS. **Aim of the study:** To evaluate the effect of Postprandial Hyperglycemia (PPH) as a risk factor for Coronary Heart Disease in type 2 diabetic patients. **Patients and methods:** Sixty-three patients were included in this study. All have controlled fasting blood sugar, with HbA1c correlation. They

were all followed for five months period (from May to October 2002). A two-hour postprandial glucose (PPG) was performed for all patients. Other risk factors taken into consideration include hypertension, obesity, and dyslipidemia. The study was performed after at least three months of controlled fasting blood sugar. ECG was done for all patients. **Results:** Out of the 63 type 2 diabetic patients, 20 had normal PPG and HbA1c levels, one has ischemic changes on ECG (5%) (P -value $>$ 0.05), twenty patients had normal HbA1c and high PPG with 7 showed ischemic changes on ECG (35%) (P -value $<$ 0.05). 17 patients showed high PPG and high HbA1c & 4 of them showed ischemic changes on ECG (23.5%) (P -value $<$ 0.05). The remaining 6 patients had normal PPG but high HbA1c and only one of them showed ischemic changes on ECG (16.7%) (P -value $>$ 0.05). **Conclusion:** This study showed that postprandial hyperglycemia is a significant risk factor for Ischemic Heart Disease (IHD).

Effects of streptozotocin-induced diabetes on heart rhythm in the rat

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Objectives: A telemetry system was employed to investigate the effects of long-term streptozotocin (STZ)-induced diabetes on heart rate (HR) and heart rate variability (HRV). **Methods:** Transmitters were surgically implanted ip in male (250-260g) Wistar rats. ECG, physical activity (PA) and body temperature (BT) data were continuously recorded before and for 22-wks following STZ treatment (60 mg/kg, ip). **Results:** Diabetes was characterized by hyperglycaemia and reduced body weight gain. At 4-wks blood glucose in diabetic and control rats were 376 ± 25 (n=3) and 80 ± 5 mg/dl (n=3), respectively and at 24-wks were 253 ± 12 and 75 ± 3 mg/dl, respectively. HR, HRV, BT and PA declined rapidly after administration of STZ. At 4-wks HR in diabetic and control rats were 260 ± 14 and 357 ± 12 , respectively and at 22-wks were 276 ± 9 and 313 ± 12 BPM, respectively. At 4-wks HRV in diabetic and control rats were 12 ± 1 and 36 ± 4 , respectively and at 22-wks were 18 ± 8 and 26 ± 4 BPM, respectively. Interestingly, there appeared to be a partial recovery in HR, HRV, BT and PA in STZ-treated rats whereas HR and HRV appeared to decline in controls from 12-wks after treatment. **Conclusions:** Reductions in PA and BT might partly underlie the decline in HR and HRV in STZ-treated rats. Recovery of HR and HRV in STZ-treated rats might be attributed to recovery of insulin secreting pancreatic β -cells.

Cytokine Network in the Pathogenesis of Type 1 Diabetes

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Type 1 diabetes is caused by immune destruction of pancreatic β cells. There is increasing evidence that genes

outside the MHC region contribute to the pathogenesis of type 1 diabetes. Cytokines seem to play a crucial role in the pathogenesis of the disease. Three hundred and eight patients with type 1 diabetes and 150 normal controls were genotyped for polymorphism in the genes for IFN- α , IL-4, IL-6, and TGF- β . All assays employed in this study were PCR based. The IFN- α CA repeats was an octa-allelic repeat and the 3 / 3 genotype showed a significant association with type 1 diabetes ($p=0.0001$). The IL-4 C (-590) T polymorphism did not show a significant association with type 1 diabetes. The GG genotype of G (-174) C of the IL-6 gene polymorphism showed a strong association with the susceptibility towards type 1 diabetes ($p= 0.002$). The TC genotype of the TGF- β T (+869) C polymorphism also showed a significant association with type 1 diabetes ($p= 0.003$). The association of the 3 / 3 genotype of the IFNG CA repeats and no association of IL-4 C (-590) T polymorphism may support the idea of dominance of the TH1 cytokine profile and type 1 diabetes suggesting a cell mediated disease. The IL-6 G (-174) C result attests an existing hypothesis of the important role of IL-6 in the onset of type 1 diabetes and its development. Immunosuppression of the TGF- β may have been initiated after deviation of the TH1/TH2 cytokine milieu. The GC of the IL-6 G (-174) C and the TC of the TGF- β T (+869) C showed strong association with diabetic nephropathy. Haplotype studies showed that cytokine function might be as a result of a cytokine network rather than individual cytokines. Further, the genetic susceptibility may be influenced not only by genetic composition but by the gender of patients as well as age at onset of type 1 diabetes. In conclusion these results suggest a contribution of the IFNG CA repeats, the TGF- β T (+869) C, and the IL-6 G (-174) C to the genetic susceptibility of type 1 diabetes and may have future therapeutical values.

Keeping a step ahead-Foot pressure and gait analysis research: its contribution to the diabetic foot

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Diabetes mellitus is a biochemical disease; however a large number of lower extremity complications of the disorder are due to biomechanical dysfunction. Foot ulcers are a common and challenging problem for patients with diabetes and for the clinicians who provide their care. Prevention of foot ulcers in diabetes is essential to avoid the large number of costly amputations that are often encountered in healthcare systems world wide.

Higher foot pressures associated with vascular and neurological complications contribute to the development of foot ulcers; however muscle dysfunction during walking has also been suggested as a biomechanical factor that may play a substantial role in the development of foot ulcers (Abboud et al. 2000).

The aim of the project was to further investigate the relationship between muscle function and foot pressure during walking in diabetic patients by developing a system (IMAR system) that can simultaneously measure bilateral in-shoe foot pressure (Novel Pedar), lower limb muscle activity (EMG) and joint parameters (Vicon 3D motion analysis) dynamically and in real time.

The IMAR system presents a novel approach in the assessment of diabetic feet. In preliminary trials carried out on non-diabetic volunteers the IMAR system demonstrates consistent results. Currently the system is being used to gather data in diabetic subjects.

This innovative method of assessing the diabetic foot intends to provide a better biomechanical understanding of the aetiology of diabetic foot problems and aims to explore suitable ways of preventing foot ulcer development. We strongly believe that the art of dealing with diabetic foot problems requires a rigorous scientific approach, which is facilitated by this technology.

Prevalence of Diabetic Neuropathy, Foot Ulceration Peripheral Vascular Disease and Potential Risk Factors Among People with Diabetes in Bahrain.

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Objective: Diabetes mellitus leads to numerous neuropathic syndromes. Although epidemiological studies show high prevalence of diabetes in Arabs, the control of diabetes is still poor and the complications of diabetes are widespread. We examined the prevalence of peripheral diabetic neuropathy (DN), neuropathic foot ulceration (FU) peripheral vascular disease (PVD) and the impending risk factors among patients with people with attending diabetic clinic in primary health care centers in Bahrain. **Research design and methods:** 1477 diabetic patients aged 18-75 years, that included 635 men and 842 women were studied. The cross-sectional study was conducted in the diabetic clinic of the all primary health care in the Kingdom of Bahrain. The main outcome and measures are de **Results:** Mean age of the patients and known diabetes duration were 57.3 ± 6.32 and 9.5 ± 8.4 years, respectively. Diabetic patients with neuropathy were older (mean 59.46 years SD 16.37) than those with out (mean 49.3 years, SD 17.17 $p = 0.001$) and had diabetes for a longer period (mean 8.6, SD 9 years vs 5.9 SD 6.7, $p = 0.002$). 532 (37.2 percent, 95% confidence limits 32.1-35.6%) patients had neuropathy according to the criteria used. 90 (6.3 percent, 95% confidence limits. Age, height, glycated haemoglobin (HbA1c), diabetes duration, but not gender was found to be significant risk factors in univariate analyses for diabetic neuropathy. Furthermore, investigation by multiple logistic

regression analysis of the above variables showed that all variables remained significant risk factors for diabetic neuropathy ($p < 0.05$). Diabetic neuropathy and peripheral vascular disease remained risk factors for foot ulceration after adjusted for all other factors in the model ($p < 0.05$). **Conclusion:** Diabetic neuropathy and peripheral vascular disease rates are high among diabetic patients in Bahrain, therefore they are at risk of foot ulceration. Strategies to reduce the risk of neuropathy should be developed commencement from primary health care and should involve all the diabetic population in all areas of the Kingdom of Bahrain.

Preliminary Results of the Use of Compressed Air Massage in the Management of Diabetic Ulcers

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The management of diabetic foot ulcers remains a problem. A new treatment modality has been developed that uses compressed air massage as a supplement to standard surgical and medical treatment. Compressed air massage is thought to improve local tissue oxygenation around ulcers. The aim of this ongoing study is to determine whether compressed air massage influences the rate of healing of diabetic ulcers. **Method:** Sixty consecutive diabetic patients, admitted to RK Khan Hospital for urgent surgical management of diabetic foot ulcers were randomised into two groups. Both groups received standard medical and surgical management of their diabetes and ulcer. In addition, one group received 15 to 30 minutes of compressed air massage daily, at 1 atmosphere pressure, for 5 days a week, to the foot and the tissue around the ulcer. Healing time was calculated as the time from admission to the time of re-epithelialisation or successful skin graft. **Results:** The outcome of the first 47 healed ulcers is available for review. 21 patients received compressed air massage. There was no difference in the mean age, Wagner score, ulcer size, pulse status or peripheral sensation in the two groups. The time to healing in the compressed air massage group was significantly reduced, $57.0 + 22.1$ days (95% CI: 46.9-67.0) vs $82.0 + 24.3$ days (95% CI: 72.2-91.8), $p=0.0007$. **Conclusions:** The addition of compressed air massage to standard medical and surgical management of diabetic ulcers appears to enhance ulcer healing. Further studies with this new treatment modality are warranted.

The prevalence of Charcot joint disease in Kuwait

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Objectives: To assess the prevalence of Charcot joint in diabetic in the capital area of Kuwait and to design a

treatment protocol that fits our health care system. **Methods:** Patients attending the Kuwait Diabetic Society Awareness Clinic and the Amiri Hospital diabetic foot clinic were screened for the presence of Charcot joint. Clinical examination using early signs of the disease, the laser temperature scan, radiographical evaluation were used. 500 patients were identified. Patients characteristics, HhA1c, diabetes complication were studied. **Result:** 1400 patients were screened, 518 (37%) were found to have Charcot joint at deferent stages. Factors in favour of developing Charcots are; female gender, duration of diabetes, type 1 diabetes and presence of diabetes complications. **Conclusions:** Charcot joint is a common complication of diabetes in Kuwait. The level of glycaemic control and the presence of other diabetes complication may have an impact on the development of Charcot joint disease.

The Diabetic Foot Infections, The Antibiotic Choice

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Objectives: To evaluate the antibiotic prescribing practice in patients referred to the diabetic foot clinic, Amiri Hospital. **Methods:** A retrospective evaluation of 1000 patients who were prescribed antibiotics by primary care doctors, during the period 2002-2004. All had wound cultures, soft tissue and or bone biopsies at our clinic. Our antibiotic protocol is; for mild infection we use first generation penicillins and Cephalosporins, for moderate infection a combination of broad-spectrum antibiotics and for severe infections, IV forth generation penicillins with a combination of anaerobic covering agent. **Results:** 500/1000 (50%) were placed on the on an inappropriate antibiotic as shown by culture results. 300/1000 (30%) were found to be under-treated, and another 200/1000 (20 %) had no infections that required antibiotics. **Conclusion:** Inappropriate antibiotics choice is a major problem in the diabetic foot management in our community

Felt pad as a primary offloading device.

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Objectives: To evaluate the effectiveness of the felt pad as an offloading modality in dealing the diabetic foot ulcers. **Methods:** 1000 patients with diabetic foot ulcers at different sites of the foot were placed in this ongoing study. We used the Celona pad compared to the diabetic offloading shoe. This study was done over a period of 2 years. **Results:** 700 (70%) patients were placed on the Celona pad using the podiatry cuts (offered free), while 300 (30%) on honey comb offloading shoes (purchased by the patients). All were seen on regular intervals, every other day for the Celona pad group and every 5-7 days for the other group. In the Celona pad group the

mean healing time was 29 days, while in the honey comb offloading shoes group was 102 days. The Celona group required more dressing changes. **Conclusion:** The Celona pad is more effective as an offloading device in terms of healing time and cost.

Triglycerides level is the most predictable factor of metabolic syndrome in adults: a population study using modified ATP III criteria

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Background and aims: To elucidate the prevalence and clinical characteristics of Metabolic Syndrome (MetS) defined by the modified ATP III criteria in middle-aged people with or without family history of type 2 Diabetes. **Materials and methods:** Population based, cross-sectional study including 214 participants (84 males, 130 females), over the age 40 was conducted at the Egyptian Diabetes Center. The survey provided data on anthropometric, biochemical and various questionnaires including life style. MetS, according to modified ATP III criteria was defined if three or more of the following criteria were satisfied: 1) Abdominal obesity; Waist circumference (WC) in men > 90 cm and in women > 80 cm. 2) Hypertriglyceridemia; > 150 mg/dl. 3) Low HDL cholesterol; < 40 mg/dl in men and < 50 mg/dl in women. 4) High blood pressure; > 130/85 mmHg. 5) High fasting plasma glucose; >110 mg/dl. Insulin resistance was analyzed by HOMA-IR. **Results:** Mean age of study population was 52.4±8.4 years and mean body mass index (BMI) was 27.3±2.3 kg/m². Overall prevalence of MetS was 37.8%(28.8 % in men, 46.8% in women). The prevalence of MetS for each age group in men was as follows: age 40-49 (39.3%), 50-59 (31.5%), 60-69(23.2%), and over 70(21.2%). In women: age 40-49(42.6%), 50-59(55.3%), 60-69(48.1%), and over 70 (41.2%). Using ATP III criteria, the prevalence of MetS in men was 15.6% and 33.2% in women. Prevalence of abdominal obesity was 33.2% (men) & 65.2%(women). The degree of increment of HOMA-IR & fasting insulin levels depended on the number of components of MetS. Relative risk of MetS increased as HOMA-IR & fasting insulin levels did. Interestingly, in men, the prevalence decreased with aging, but not in women with consistent increment. Among various metabolic risk factors, age, triglycerides, fasting glucose & systolic blood pressure were well correlated with the prevalence of MetS. Triglycerides level was the most predictable factor for MetS by step-wised multiple logistic regression analysis. **Conclusion:** The prevalence of metabolic syndrome in adults was somewhat different from other previous studies, especially in men. Triglycerides level was the most predictable factor for Metabolic Syndrome in adults.

Applied Clinical Roles of Testosterone, Estradiol and Progesterone in Insulin Secretion and Insulin Sensitivity

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The main purpose of the present study was to examine the effects of testosterone, estradiol or progesterone on insulin secretion and insulin sensitivity in rats. Glucose / insulin ratio was also considered as insulin sensitivity index and insulin or glucose concentration was measured after a period of 4 weeks in each experiment. Testosterone injection in male rats (50mg/kg/day) resulted in increased serum insulin and glucose concentration and decreased insulin sensitivity. However, insulin sensitivity was increased following ovariectomy. In female rats estradiol injection (200 microg/kg/day) caused increased serum insulin and glucose concentration but decreased insulin sensitivity. On the other hand, decreasing of serum insulin and increasing of insulin sensitivity was observed following progesterone administration (20mg/kg/day). Therefore, from applied clinical point of view, testosterone and estradiol can be used as insulin sensitivity reducer but progesterone as insulin sensitivity enhancer.

Accuracy of MiniMed Continuous Glucose Monitoring System during hypoglycemia

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Introduction: The first continuous glucose sensing system to be approved by the US Food and Drug Administration is the MiniMed Continuous Glucose Monitoring System or CGMS. The goal of this study was to evaluate the accuracy of the CGMS under conditions of sustained hypoglycemia (2.8 mmol/L). **Methods:** 12 patients with type 1 diabetes mellitus who were undergoing evaluation of their counter regulatory hormone response during hypoglycemia using the euglycemic-hypoglycemic clamp technique participated in this study. Constant insulin and variable glucose infusion rates were used to control the blood glucose levels. The blood glucose was maintained at this level for 60 minutes (euglycemia phase). It was then gradually reduced to the hypoglycemia target of 50mg/dL (2.8mmol/L) over a period of approximately 20 minutes and maintained at this target level for a period of 40 minutes (hypoglycemia phase). Every 5 minutes during the study, blood samples were immediately measured. At the completion of the CGMS period, the system was returned and the data downloaded via the MiniMed Com-Station. **Results:** In total 759 blood glucose sensor/reference value pairs were analyzed. In the Clark error grid, 99 % of the pairs fall within the clinically acceptable zones (zone A, 61% and zone B 39 %). There were no pairs fell in zones C and E and only 1% fell in zone D. Analysis of venous blood measurement showed that 30.8 % (234) of values were in the hypoglycemic range (< 3.8 mmol/l), 59.4 % (451) were in the euglycemic range (3.9-1-180), and 9.7 % (74) were in the hyperglycemic range (> 10.1 moml/l). The over all bias

between the sensor and the reference values was -16 ± 25.0 . The mean difference stratified by glycemic range is as follows: in hypoglycemia -10 , -20% in euglycemia, and -9.9 in hyperglycemia. The overall mean absolute difference was 24.3 ± 17.0 . In the hypoglycemic range, 28.3% of the measurements were within $\pm 10\%$, and 57.9% within $\pm 20\%$. **Conclusion:** The MiniMed CGMS is the first ambulatory continuous glucose monitoring system with FDA approval. It proves itself to be stable, reliable, and accurate device across wide glycemic ranges.

The effect of insulin sensitization on fasting and postprandial lipid metabolism in type 2 diabetes

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The thiazolidinediones (TZDs), which increase insulin-mediated glucose uptake into muscle and adipose tissue, improve glycaemic control and lower insulin levels in type 2 diabetes. TZDs (particularly pioglitazone) also have effects on lipid and lipoprotein metabolism. We have undertaken detailed fasting and postprandial studies in type 2 diabetes ($n=22$) randomly allocated in a double-blind trial to a regime incorporating pioglitazone (45 mg/day) compared to a glibenclamide-based regime designed to achieve the same glycaemic control over a 20 week treatment period. Normal control subjects ($n=10$) were also studied. At 20 weeks, fasting total triglycerides, VLDL-1 and VLDL-2 were significantly lower in the pioglitazone group significantly so for total and VLDL-2 ($p < 0.05$). Postprandial hypertriglyceridaemia measured as area-under-the-curve over 8 hours following a standardised mixed meal was significantly reduced in the pioglitazone group such that it did not differ from non-diabetic controls. This reduction was due significant reductions in both chylomicron triglycerides and chylomicron remnant triglycerides. Significant reductions were also observed in postprandial IDL and LDL triglycerides concentrations in the pioglitazone group. These observations are particularly interesting given the identical glycaemic control between the pioglitazone and glibenclamide treated groups. In summary, important effects on fasting and postprandial triglyceride metabolism are observed in type 2 diabetic patients treated with the insulin sensitiser, pioglitazone, compared to patients treated with glibenclamide at the same level of glycaemic control.

The effectiveness of Carbohydrate Counting in Saudi diabetic patients treated with intensive insulin therapy

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Diabetes often makes patients feel that their lives are controlled by the demands of their diet. Because a rigid meal plan can be an obstacle to good metabolic control, establishing an individualized and flexible meal plan may be

more useful for helping patients achieve their diabetes management goals.

Carbohydrate counting is a meal planning approach used with persons who have diabetes that focuses on carbohydrate as the primary nutrient affecting postprandial glycemic response. The concept of carbohydrate counting has been available since the 1920s, but it received renewed interest after being used as 1 of 4 meal planning approaches used in the Diabetes Control and Complications Trial (DCCT). In the trial, carbohydrate counting was found to be effective in meeting outcomes goals and improved adherence to diet, allowed flexibility in food choices and management of changes in food intake by adjusting insulin dose or by matching insulin to food, which is, using carbohydrate-to-insulin ratios. Recent practice surveys have shown an interest in and use of carbohydrate counting for medical nutrition therapy for persons with diabetes.

The aim of this paper is to describe our experience in the diabetic center in teaching carbohydrate counting and evaluate the effectiveness of this advanced meal plan approach in Saudi diabetic patients being treated with intensive insulin therapy. Case studies will be presented.

The Kids on the Block Diabetes Education and Awareness Program

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There appears to be a discrepancy in the UAE with regard to the prevalence of Diabetes Mellitus, Public Awareness and Diabetes Education. Our group's aim is to strengthen and develop educational means in the field of diabetes in UAE. For this purpose, we adopted the Kids on The Block Diabetes Education Program, an innovative and interesting program devised to create awareness and understanding of Diabetes, educate children about diabetes, address issues pertaining to this condition in a lively and entertaining manner.

The program is delivered by our group as a live performance using Bunraku (Japanese) style of puppetry, and during which audience participation is encouraged. The presentation consists of scripted puppet shows and songs performed by our puppeteers. Each performance highlights a particular aspect of diabetes, followed by an interactive session between the audience and the puppets where questions and answers are handled in a relaxed but informative manner.

A single performance takes about 10 minutes plus the interactive / question time. Information about diabetes may be provided in advance of the Kids on the Block performances to help the audience prepare for the question time and interactive discussion. As well, suggested follow-up educational materials can be provided to enhance and reinforce what the Kids on the Block taught during the performances.

Although originally designed for children, we feel that the Kids on The Block Diabetes Education Program is a very

useful tool for diabetes education that could address successfully all age groups, health care professionals as well as patients and their families.

Effects of aerobic exercise on serum Lipoprotein of IDDM men

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Background & Purpose: Type I diabetes mellitus is major worldwide health problems as well as in Iran predisposing to markedly increased cardiovascular mortality and other serious morbidity. The purpose of this study was to investigate the effects of submaximal aerobic exercise (intensity 56% HRR) during a nine –week period on blood plasma lipoproteins profiles, and the function of oxygen transport system of 18-28 years old young adults suffering from diabetic disease (IDDM) who underwent daily insulin injection amount 48.9 pmol. **Material & Methods:** Twenty-five diabetics (type 1) from 169 patients who were member of Diabetic Research Center of Hamadan University of Medical Sciences in Hamadan, participated in the study. They were randomly divided into two groups (group 1, experimental group = 13 patients; group 2, control group = 10, two patients drop out of the study). Group 1 was signed an exercise program two times a week (30 to 60 min. per section) during the 9-week period. Blood sample of both group were taken at rest and after exercise in order to estimate the lipoproteins and, blood profiles such as VLDL-C, LDL-C, HDL-C, HDL/LDL, HDL/CHO, FBS, HbA1C, also functional variables of cardiovascular system (VO₂Max, hart rate recovery) and anthropometric factors (LBM, W/H) were measured. **Results:** The results showed a significant increase in concentration of HDL-C (from M=37.46, SD=6.6 mg/dl to M=42.8, SD=10.8 mg/dl) and decrease in LDL-C (from M=100.06, SD=23.2 mg/dl to M=93.75, SD=13.01 mg/dl). **Conclusion:** It seems that submaximal aerobic program (%56 HRR) for IDDM can be effective.

Diabetes Education as a “Model for Improvement of Patient Outcome”

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Empowerment is a vision or a philosophy of giving care. It is defined as a success based on Empowerment Philosophy by judging how well our patients are to set and achieve their set goals. A satisfying and joyful diabetes education is based on the vision and faithfulness to the vision. Diabetes education is and will remain an art. Science will help us to identify useful

tools, but tools will never be more important than the vision, character and skills of the diabetes educator using those tools. No one can “get” people with diabetes to do anything. If change is needed, it must be inspired and direct by the individuals. So Education is an important part of diabetes management, several major studies like DCCT and UKPDS have stated that education improves glycemetic control.

We strongly believe in the empowerment theory, and the educational support is given fully to all our patients in the center in the form of 5 Days Educational Program. An example is of 526 patients who went through this educational program and their average HbA_{1c} showed a marked improvement. (The data will be presented in the symposium). So Education brings better diabetes control, less cost and better quality of life.

Is the Internet a proper and effective tool for Diabetes Education? What is the expected effect of internet on the outcome of Diabetes management?

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Background and aims: This website www.onlinediabetes.net was displayed on June 2003 as a free information resource for people with Diabetes and also for Diabetes health care providers, the website was promoted by the Egyptian Diabetes Center. Beside the information offered by this website, there was also information about the activities and services offered by the Egyptian Diabetes Center. The tendency for people with Diabetes and their health care providers to get their needed information through the internet was assessed and also we did assess for how far people with diabetes would seek services through the internet. The aim of this study was to answer some simple questions: Is the Internet a proper and effective tool for Diabetes Education? **Material and methods:** The staff of the Egyptian Diabetes Center prepared a questionnaire and asked the server hosting firm to display it. The questionnaire was available online for two months (October & November 2004), then the results were analyzed. **Results:** We did record 3023 visitor to our website during these two months, compared to 212 visitor in the same period during the year 2003. This marked increase is about (1425 %). Data were collected from 884 participants who filled the questionnaire, 854 (96.6%) of those were from Egypt, 30 participants (3.4%) from other countries. 196 of participants (22.2 %) were not having Diabetes, of those were 50 participants (25.5 %) were health care professionals, 136 (69.4 %) were collecting information for their relatives with Type 1 Diabetes and 10 (5.1%) participants were collecting information for their relatives or friends with Type 2 Diabetes. 688 of the participants (77.8%) were having Diabetes, of those were 233 participants (33.9%) having Type 1 Diabetes and 455 (66.1%) having Type 2 Diabetes. As for the health care professionals (50 participants), 38 of them (76%) did find the web site very informative and increased their knowledge, 32 of them (64%) did recommend the website for their patients.

As for people with Type 1 Diabetes, of a total 233 participants, 197 (84.5%) found the website informative, 166 (71.2%) think that this site could improve their outcome, while 152 (65.2%) indicate that the site could help in preventing complications. For a question about the top three topics they are interested to know about through the website: nutrition & dieting 185 participants (79.3%), hypo or hyperglycemia 171 participants (73.4%) & sports 131 participants (56.2%). As for people with Type 2 Diabetes, of a total 455 participants, 361 (79.3%) found the website informative, 285 (62.6%) think that this site could improve their outcome, while 261 (57.4%) indicate that the site could help in preventing complications like heart attacks, diabetic foot affections & sex problems. For a question about the top three topics they are interested to know about through the website: nutrition & dieting 353 participants (77.6%), heart attacks 333 participants (73.2%) & good sex performance 252 participants (55.4%). **Conclusions:** The presence of the website per se on the internet does not work well except after advertising it by all means. People with Type 1 are more interested in getting information through the internet than people with type 2. Our results showed that 33.9% of the participants were Type 1 compared to 66.1% with Type 2 despite the real existence of diabetes in our community is 8% Type 1, 91.5% Type 2 and 0.5% other. There was a high interest among all groups of participants to get information through the internet. However the special needs for each group should be considered: for example young children asked much about eating chocolate & playing soccer, females asked more about safe pregnancy and men asked more about sex performance.

Dietary herbal intervention may help in reducing blood sugar levels and eliminate other pathological complications in Diabetes Mellitus

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Garlic (*Allium sativum*) and ginger (*Zingiber officinale*) have been used as spices, foods, and folklore medicines for many years. Garlic is the most widely researched medicinal plant (Ali et al, Prostaglandins, Leukotrienes and Essential Fatty Acids, 62(2): 55-73, 2000). In our study, we have observed hypoglycemic and hypocholesterolemic effects of aqueous extracts of garlic and ginger in streptozotocin (STZ)-induced diabetic rats. Raw aqueous extracts of garlic and ginger were administered daily (500 mg/kg), intraperitoneally (IP) for a period of six weeks to STZ-induced diabetic rats. Fasting blood serum were assayed for blood glucose and cholesterol levels. Garlic and ginger at a dose of 500 mg/kg were significantly effective in lowering the blood glucose and cholesterol levels of STZ-induced diabetic rats. In addition, STZ-induced diabetic rats have shown increased water intake,

urine output and proteinuria during the experimental period. These parameters were significantly affected by IP administration of raw extracts of garlic and ginger. These results strongly indicate- that garlic and ginger possess hypoglycemic and hypocholesterolemic potential. Additionally, garlic and ginger were also effective in reversing the diabetic proteinuria observed in our STZ-induced diabetic rats. Thus, it is concluded from the outcome of our present study that garlic and ginger will be of great nutritional value in the management of elevated blood glucose and cholesterol levels. Therefore, it is recommended that these herbs should be consumed on a regular basis for a prolonged period in order to achieve therapeutic effect.

Undiagnosed Diabetes among Adult Moroccan Sahraoui Women

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Objective: The goal of this work was to examine the prevalence and associated risk factors of undiagnosed diabetes among urban Moroccan Sahraoui women. **Methods:** Data were collected from a randomised sample of adult women aged 15 and older, non-pregnant who visited the Public Health Centres during immunization campaign of Laayoune city of South Morocco. Only subjects identified as of Sahraoui origin were eligible for this investigation. Body weight, height, circumferences of waist (WC) and hip, blood pressure, fasting plasma glucose (FPG), triglycerides (TG), dietary intake and physical activity were collected. **Results:** The prevalence of undiagnosed diabetes was 6.4% of women. Obesity, hypertension, hypertriglyceridemia and familial history of diabetes were more common among diabetic women than those with normal glycaemia. Similarly, means of age, BMI, WC, WHR (waist/hip ratio), sucrose intakes, plasma (TG), systolic and diastolic pressure were higher in diabetic women than in those with normal glycaemia. The physical activity estimated by the time spent in walking was negatively associated with (FPG). Also, regression analyses show that age, obesity, family history of diabetes and (TG) were independently associated with diabetes. **Conclusion:** The high proportion of unknown diabetes suggests a need for increased diabetes awareness in this population. The data suggest also the involvement of obesity in diabetes and the potential importance for intervention strategies to reduce population adiposity for the prevention and management of cardiovascular risk factors.

Anxiety and depression in type 2 diabetics

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Objective: To estimate the prevalence's of anxiety and depressive symptoms in adults with type 2 diabetes.

Research design and methods: 110 type 2 diabetics (82 women and 28 men) aged 20-64 years, from outpatient endocrinology unit. Anxiety and depression were assessed by Hamilton scales. **Results:** The prevalence of anxiety was 76% (minor anxiety 34%, major anxiety 42%). There were significant relationship between anxiety and diabetes complications ($p < 0.005$). The prevalence of depression was 34% (minor depression 24%, major depression 10%). Depressive symptoms were significantly associated with duration of diabetes and diabetes complications ($p=0.002$). **Conclusion:** Anxiety and depression are frequent in type 2 diabetics. Diabetics with anxiety or depression have been shown to have poorer glycemic control and a higher incidence of diabetic complications. Thus early detection and treatment of these disorders will improve the prognosis of diabetes and the quality of life of diabetics.

Effectiveness of the 13C-glucose breath test in identifying persons at risk for type 2 diabetes

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We have previously demonstrated that the 13C-glucose breath test outperforms the HOMA index in the measurement of insulin resistance. In order to determine whether it could identify those persons likely to develop type 2 diabetes compared to current methodologies, the following study was carried out. Seventy-two verified type 2 diabetic patients and 28 normal, non-insulin resistant subjects took part in this study. Each subject underwent the 13C-glucose breath test, an oral glucose tolerance test (OGTT) and measurement of fasting serum insulin and glucose from which the HOMA index was calculated. Based on the known clinical status of the subjects, diagnostic characteristics of the various tests were compared. Receiver operated characteristics (ROC) for the 13C-glucose breath test indicated an optimal cutoff of 9.0 (value is change in expired 13CO₂ expressed in d per mil). Area under the ROC curve was 95.3% with a highly identifiable shoulder. Sensitivity for the 13C-glucose breath test was 93% with a specificity of 89% giving an overall diagnostic accuracy of 92%. Comparatively, fasting blood glucose, the glucose tolerance test and HOMA had diagnostic accuracies of 72%, 74% and 69%, respectively. The 13C-glucose breath test may offer advantages over currently used techniques to identify patients at risk of dysglycemia. However, the current study was somewhat of an artificial situation and further prospective studies will need to be carried out.

Study of the effect of Diabetes Education in poor women in Los Angeles, USA

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Objective: The purpose of this study was to provide diabetes education to poor women in Los Angeles, USA. **Methods:** Data was based on number of participants attending the workshops and participant satisfaction survey. **Results:** Data indicated that more than 90 percent of participants strongly believed that the objectives of the course were clear and the use of the time was utilized effectively. More than 90 percent strongly agreed that the instructor respected them as a person and the course met their learning needs. About 60 percent strongly believed that the facilities were comfortable and visual aids could be easily see. More than 90 percent of the participants did not have trouble hearing the speaker. Finally more than 80 percent of the participants strongly claimed that they would recommend this course to others. **Conclusion:** The results of the diabetes education workshop show that such courses could be beneficial to participants.

The Correlation between personality type with adherence to therapeutic regimens in type 2 diabetic patients

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Background: Many researchers have paid attention to adherence as an important proposition. In the health behavior category adherence is a basic and important issue because it can lead to cure or debility and outshine the outcomes of the treatment. **Objective:** The study was aimed to determine the relationship between personality type with adherence level to therapeutic regimens in type 2 diabetic patients. It was supported by health beliefs model as study framework. **Method:** Two hundred fifty type 2 diabetic patient that use hypoglycemic agents with or without insulin, were entered to study by nonprobability sampling method. Data were collected by questionnaire through interview. The NEO-FFI scale applied for measuring five personality factors, including neuroticism (N), extraversion (E), openness (O), agreeableness (A), and conscientiousness (C). The activities questionnaire (Hernandez 1997) were used to measure adherence level. Health beliefs of diabetic patients were measured by Backer & Janz (1985) scale. A two choice scale containing 9-item was created to measuring current social barriers that diabetic patients may be facing. A 3-point likert 9-item scale was created to measure subject's social support. Depression, anxiety, stress scale (DASS) were used to determine the levels of this emotional variables. **Results:** The results of correlation test indicated that there was a negative relationship between N and adherence to therapeutic regimens, however it was not significant ($p=0.061$). Also E was significantly correlated with adherence ($p < 0.001$). No statistically significant relationships were found between O and A with adherence. But significantly positive relationship was found between C and adherence ($p=0.006$). Finally, the general linear model test demonstrated that Extraversion ($P=0.003$) and social support ($P=0.048$) had the most effects on diabetic patient's adherence. **Conclusion:** The negative

relationship between N and adherence can be due to capability of more experience stressful life events and depressive mood. It can lead to hopelessness with regard to failure in adherence to difficult and complex diabetic therapeutic regimens. The strong positive correlation between E and adherence can be related to presence of optimism, hopefulness, and cheerfulness

that increase the patient's motivation for adherence. In the C trait, incisiveness, purposefulness, self-control, to be firm and steadfast in decisions, can lead to success in adherence to therapeutic regimens in diabetic patients. Nevertheless social support can influence patient's adaptation and increase motivation for adherence through willpower.