RESEARCH STUDIES ON YOGA THAT CAN PROVIDE A SCIENTIFIC BASIS OF USING YOGA IN PREVENTION AND MANAGEMENT OF DIABETES MELLITUS


A REVIEW OF YOGA PROGRAMS FOR FOUR LEADING RISK FACTORS OF CHRONIC DISEASES.
Yang K

Yoga, a form of physical activity, is rapidly gaining in popularity and has many health benefits. Yet healthcare providers have been slow to recognize yoga for its ability to improve health conditions, and few interventions have been developed that take full advantage of its benefits. The purpose of this article is to review published studies using yoga programs and to determine the effect of yoga interventions on common risk factors of chronic diseases (overweight, hypertension, high glucose level and high cholesterol). A systematic search yielded 32 articles published between 1980 and April 2007. The studies found that yoga interventions are generally effective in reducing body weight, blood pressure, glucose level and high cholesterol, but only a few studies examined long-term adherence. Additionally, not enough studies included diverse populations at high risk for diabetes and its related common health problems.


LIFESTYLE MODIFICATION IN MANAGEMENT OF DIABETES MELLITUS
Sahay BK, Sahay RK

India has the largest diabetic population in the world. Change in eating habits, increasing weight and decreased physical activity are major factors leading to increased incidence of type 2 diabetes. Obesity is the most important modifiable risk factor. Smoking is an independent risk factor for type 2 diabetes mellitus. Diet and exercise are primary therapeutic options for its management. Dietary management should not only aim to achieve glycaemic control but to normalise dyslipidaemia. Smoking cessation reduces the risk of morbidity and mortality in CAD. Exercise improves the condition of a diabetic patient. Exercise includes yoga practices which have a role to play in the prevention of type 2 diabetes.


EFFECT OF YOGA BASED LIFESTYLE INTERVENTION ON SUBJECTIVE WELL-BEING.
Sharma R, Gupta N, Bijlani RL

Yoga is assuming importance in improving mental health and quality of life in the treatment of a number of psychiatric and psychosomatic disorders. The present study was a prospective controlled study to explore the short-term impact of a comprehensive but brief lifestyle intervention, based on yoga, on subjective well-being levels in normal and diseased subjects. Normal healthy individuals and subjects having hypertension, coronary artery disease, diabetes mellitus or a variety of other illnesses were included in the study. The outcome measures were 'subjective well being inventory' (SUBI) scores, taken on the first and last day of the course. The inventory consists of questions related to one's feelings and attitude about various areas of life, such as happiness, achievement and interpersonal relationship. There was significant improvement in the subjective well being scores of the 77 subjects within a period of 10 days as compared to controls. These observations suggest that a short lifestyle modification and stress management educational program leads to remarkable improvement in the subjective well being scores of the subjects and can therefore make an appreciable contribution to primary prevention as well as management of lifestyle diseases.
CONTEXTUALIZING THE EFFECTS OF YOGA THERAPY ON DIABETES MANAGEMENT: A REVIEW OF THE SOCIAL DETERMINANTS OF PHYSICAL ACTIVITY.

Alexander GK, Taylor AG, Innes KE, Kulbok P, Selfe TK.

This article provides a review of literature both to identify the effects of yoga-based therapy on the management of type 2 diabetes mellitus and to examine the social context of physical activity. Findings from the review indicate that yoga has a positive short-term effect on multiple diabetes-related outcomes; however, long-term effects of yoga therapy on diabetes management remain unclear. The context of the social environment, including interpersonal relationships, community characteristics, and discrimination, influences the adoption and maintenance of health behaviors such as physical activity, including yoga practice. Further research is necessary to determine the extent of this influence.

ASHTANGA YOGA FOR CHILDREN AND ADOLESCENTS FOR WEIGHT MANAGEMENT AND PSYCHOLOGICAL WELL BEING: AN UNCONTROLLED OPEN PILOT STUDY.

Benavides S, Caballero J.

OBJECTIVE: The objective of this pilot study was to determine the effect of yoga on weight in youth at risk for developing type 2 diabetes. Secondly, the impact of participation in yoga on self-concept and psychiatric symptoms was measured. METHODS: A 12-week prospective pilot Ashtanga yoga program enrolled twenty children and adolescents. Weight was measured before and after the program. All participants completed self-concept, anxiety, and depression inventories at the initiation and completion of the program. RESULTS: Fourteen predominately Hispanic children, ages 8-15, completed the program. The average weight loss was 2kg. Weight decreased from 61.2+/‐20.2kg to 59.2+/‐19.2kg (p=0.01). Four of five children with low self-esteem improved, although two had decreases in self-esteem. Anxiety symptoms improved in the study. CONCLUSION: Ashtanga yoga may be beneficial as a weight loss strategy in a predominately Hispanic population.

COMMUNITY BASED YOGA CLASSES FOR TYPE 2 DIABETES: AN EXPLORATORY RANDOMISED CONTROLLED TRIAL.

Skoro-Kondza L, Tai SS, Gadelrab R, Drincevic D, Greenhalgh T.

BACKGROUND: Yoga is a popular therapy for diabetes but its efficacy is contested. The aim of this study was to explore the feasibility of researching community based yoga classes in Type 2 diabetes with a view to informing the design of a definitive, multi-centre trial METHODS: The study design was an exploratory randomised controlled trial with in-depth process evaluation. The setting was two multi-ethnic boroughs in London, UK; one with average and one with low mean socio-economic deprivation score. Classes were held at a sports centre or GP surgery. Participants were 59 people with Type 2 diabetes not taking insulin, recruited from general practice lists or opportunistically by general practice staff. The intervention group were offered 12 weeks of a twice-weekly 90-minute yoga class; the control group was a waiting list for the yoga classes. Both groups received advice and leaflets on healthy lifestyle and were encouraged to exercise. Primary outcome measure was HbA1c. Secondary outcome measures included attendance, weight, waist circumference, lipid levels, blood pressure, UKPDS cardiovascular risk score, diabetes-related quality of life (ADDQoL), and self-efficacy. Process measures were attendance at yoga sessions, self-reported frequency of practice between taught sessions, and qualitative data (interviews with patients and therapists, ethnographic observation of the yoga classes, and analysis of documents including minutes of meetings, correspondence, and exercise plans). RESULTS: Despite broad inclusion criteria, around two-thirds of the patients on GP diabetic registers proved ineligible, and 90% of the remainder declined to participate. Mean age of participants was 60 +/- 10 years. Attendance at yoga classes was
around 50%. Nobody did the exercises regularly at home. Yoga teachers felt that most participants were unsuitable for 'standard' yoga exercises because of limited flexibility, lack of basic fitness, co-morbidity, and lack of confidence. There was a small fall in HbA1c in the yoga group which was not statistically significant and which was not sustained six months later, and no significant change in other outcome measures. CONCLUSION: The benefits of yoga in type 2 diabetes suggested in some previous studies were not confirmed. Possible explanations (apart from lack of efficacy) include recruitment challenges; practical and motivational barriers to class attendance; physical and motivational barriers to engaging in the exercises; inadequate intensity and/or duration of yoga intervention; and insufficient personalisation of exercises to individual needs. All these factors should be considered when designing future trials.

Evid Based Complement Alternat Med. 2008 May 7

YOGA PRACTICE FOR THE MANAGEMENT OF TYPE II DIABETES MELLITUS IN ADULTS: A SYSTEMATIC REVIEW.
Aljasir B, Bryson M, Al-Shehri B.
The effect of practicing yoga for the management of type II Diabetes was assessed in this systematic review through searching related electronic databases and the grey literature to the end of May 2007 using Ovid. All randomized controlled clinical trials (RCTs) comparing yoga practice with other type of intervention or with regular practice or both, were included regardless of language or type of publication. Each study was assessed for quality by two independent reviewers. Mean difference was used for summarizing the effect of each study outcomes with 95% confidence intervals. Pooling of the studies did not take place due to the wide clinical variation between the studies. Publication bias was assessed by statistical methods. Five trials with 363 participants met the inclusion criteria with medium to high risk of bias and different intervention characteristics. The studies' results show improvement in outcomes among patients with diabetes type II. These improvements were mainly among short term or immediate diabetes outcomes and not all were statistically significant. The results were inconclusive and not significant for the long-term outcomes. No adverse effects were reported in any of the included studies. Short-term benefits for patients with diabetes may be achieved from practicing yoga. Further research is needed in this area. Factors like quality of the trials and other methodological issues should be improved by large randomized control trials with allocation concealment to assess the effectiveness of yoga on diabetes type II. A definitive recommendation for physicians to encourage their patients to practice yoga cannot be reached at present.


INSULIN SENSITIVITY AND CARDIAC AUTONOMIC FUNCTION IN YOUNG MALE PRACTITIONERS OF YOGA.
Chaya MS, Ramakrishnan G, Shastry S et al
BACKGROUND: While yoga is thought to reduce the risk of chronic non-communicable diseases such as diabetes, there are no studies on insulin sensitivity in long term practitioners of yoga. We assessed insulin sensitivity and cardiac autonomic function in long term practitioners of yoga. METHODS: Fifteen healthy, young, male practitioners of yoga were compared with 15 young, healthy males who did not practice yoga matched for body-mass index. Fasting insulin sensitivity was measured in the fasting state by the hyperinsulinaemic-euglycaemic clamp. RESULTS: There were no significant differences between the groups in their anthropometry or body composition. However, the fasting plasma insulin was significantly lower in the yoga group. The yoga group was also more insulin sensitive (yoga 7.82 [2.29] v. control 4.86 [11.97] (mg/[kg.min])/(microU/ml), p < 0.001). While the body weight and waist circumference were negatively correlated with glucose disposal rate in the controls, there were no similar correlations in the yoga group. The yoga group had significantly higher low-frequency power and lower normalized high-
frequency power. CONCLUSION: Long term yoga practice (for 1 year or more) is associated with increased insulin sensitivity and attenuates the negative relationship between body weight or waist circumference and insulin sensitivity.

Metab Syndr Relat Disord. 2008 Fall;6(3):223-9.

RESTORATIVE YOGA IN ADULTS WITH METABOLIC SYNDROME: A RANDOMIZED, CONTROLLED PILOT TRIAL

Cohen BE, Chang AA, Grady D, Kanaya AM.

BACKGROUND: Metabolic syndrome increases the risk of diabetes and cardiovascular disease. Yoga improves some metabolic parameters, but it has not been studied in persons with metabolic syndrome. We conducted a randomized controlled pilot trial to determine whether a restorative yoga intervention was feasible and acceptable in underactive, overweight adults with metabolic syndrome.

METHODS: Twenty six underactive, overweight adult men and women with metabolic syndrome were randomized to attend 15 yoga sessions of 90 minutes each over 10 weeks or to a wait-list control group. Feasibility was measured by recruitment rates, subject retention, and adherence. Acceptability was assessed by interview and questionnaires. Changes in metabolic outcomes and questionnaire measures from baseline to week 10 were calculated.

RESULTS: A total of 280 people were screened by phone, and 93 with high likelihood of metabolic syndrome were invited to a screening visit. Of the 68 who attended screening visits, 26 (38%) were randomized, and 24 (92%) completed the trial. Attendance at yoga classes and adherence to home practice exceeded our goals. In the yoga group, all participants gave the study the highest possible satisfaction rating, and the majority (87%) felt that the yoga poses were easy to perform. There was trend to reduced blood pressure (p = 0.07), a significant increase in energy level (p < 0.009), and trends to improvement in well-being (p < 0.12) and stress (p < 0.22) in the yoga versus control group.

CONCLUSIONS: Restorative yoga was a feasible and acceptable intervention in overweight adults with metabolic syndrome. The efficacy of yoga for improving metabolic parameters in this population should be explored in a larger randomized controlled trial.


EFFECT OF EXERCISE THERAPY ON LIPID PROFILE AND OXIDATIVE STRESS INDICATORS IN PATIENTS WITH TYPE 2 DIABETES.

Gordon LA, Morrison EY, McGrowder DA et al.

BACKGROUND: Yoga has been shown to be a simple and economical therapeutic modality that may be considered as a beneficial adjuvant for type 2 diabetes mellitus. This study investigated the impact of Hatha yoga and conventional physical training (PT) exercise regimens on biochemical, oxidative stress indicators and oxidant status in patients with type 2 diabetes.

METHODS: This prospective randomized study consisted of 77 type 2 diabetic patients in the Hatha yoga exercise group that were matched with a similar number of type 2 diabetic patients in the conventional PT exercise and control groups. Biochemical parameters such as fasting blood glucose (FBG), serum total cholesterol (TC), triglycerides, low-density lipoprotein (LDL), very low-density lipoproteins (VLDL) and high-density lipoprotein (HDL) were determined at baseline and at two consecutive three monthly intervals. The oxidative stress indicators (malondialdehyde - MDA, protein oxidation - POX, phospholipase A2 - PLA2 activity) and oxidative status [superoxide dismutase (SOD) and catalase activities] were measured. RESULTS: The concentrations of FBG in the Hatha yoga and conventional PT exercise groups after six months decreased by 29.48% and 27.43% respectively (P < 0.0001) and there was a significant reduction in serum TC in both groups (P < 0.0001). The concentrations of VLDL in the managed groups after six months differed significantly from baseline values (P = 0.036). Lipid peroxidation as indicated by MDA significantly decreased by 19.9% and 18.1% in the Hatha yoga and conventional PT exercise groups respectively (P < 0.0001); whilst the activity of SOD significantly increased by 24.08% and 20.18% respectively (P = 0.031). There was no
significant difference in the baseline and 6 months activities of PLA2 and catalase after six months although the latter increased by 13.68% and 13.19% in the Hatha yoga and conventional PT exercise groups respectively (P = 0.144). CONCLUSION: The study demonstrate the efficacy of Hatha yoga exercise on fasting blood glucose, lipid profile, oxidative stress markers and antioxidant status in patients with type 2 diabetes and suggest that Hatha yoga exercise and conventional PT exercise may have therapeutic preventative and protective effects on diabetes mellitus by decreasing oxidative stress and improving antioxidant status. TRIAL REGISTRATION: Australian New Zealand Clinical Trials Registry (ANZCTR): ACTRN12608000217303.


TWISTING WITHOUT SHOUTING. A GENTLE INTRODUCTION TO THE JOYS OF YOGA.
Butler C.
A small trial of type 2 patients from London's Yoga Biomedical Trust found that a 12-week yoga program helped reduce fasting blood glucose and hemoglobin A1C levels; the much larger Medicare Demonstration Project, which tracked more than 2,000 people with heart disease who did yoga and made other lifestyle changes for a year, saw similar results in participants who had diabetes, after both 12 weeks and 1 year. [...] researchers at the University College of Medical Sciences in Delhi, India, have found, through various studies, that daily yoga classes can decrease fasting blood glucose, blood glucose after meals, hemoglobin A1C, systolic and diastolic blood pressure, and also improve insulin resistance.


PSYCHOLOGICAL, SOCIAL AND BIOLOGICAL DETERMINANTS OF ILL HEALTH (PSOBID): STUDY PROTOCOL OF A POPULATION-BASED STUDY.
Velupillai YN, Packard CJ, Batty GD et al
BACKGROUND: Disadvantaged communities suffer higher levels of physical and mental ill health than more advantaged communities. The purpose of the present study was to examine the psychosocial, behavioural and biological determinants of ill health within population groups in Glasgow that differed in socioeconomic status and in their propensity to develop chronic disease especially coronary heart disease and Type 2 diabetes mellitus. METHODS: Participants were selected at random from areas known to be at the extremes of the socioeconomic continuum in Glasgow. Within the categories of least deprived and most deprived, recruitment was stratified by sex and age to achieve an overall sample containing approximately equal numbers of males and females and an even distribution across the age categories 35-44, 45-54 and 55-64 years. Individuals were invited by letter to attend for assessment of their medical history, risk factor status, cognitive function and psychological profile, morbidity, and carotid intima-media thickness and plaque count as indices of atherosclerosis. Anonymised data on study subjects were collected from the General Practice Administration System for Scotland to analyse characteristics of participants and non-participants. RESULTS: 700 subjects were recruited. The response (active participants per 100 invitation letters) in the least deprived group was 35.1% and in the most deprived group was 20.3%. Lowest response was seen in young males (least deprived 22.4% and most deprived 14.1%). CONCLUSION: This cross-sectional study recruited the planned sample of subjects from least deprived and most deprived areas within Glasgow. As evident in other studies response differed between the most and least deprived areas. This study brought together researchers/academics from diverse disciplines to build a more sophisticated understanding of the determinants of health inequalities than can be achieved through unidisciplinary approaches. Future analyses will enable an understanding of the relationships between the different types of measure, and of the pathways that link poverty, biology, behaviour and psychology and lead to health inequalities.

THE INFLUENCE OF YOGA-BASED PROGRAMS ON RISK PROFILES IN ADULTS WITH TYPE 2 DIABETES MELLITUS: A SYSTEMATIC REVIEW.

Innes KE, Vincent HK

There is growing evidence that yoga may offer a safe and cost-effective intervention for Type 2 Diabetes mellitus (DM 2). However, systematic reviews are lacking. This article critically reviews the published literature regarding the effects of yoga-based programs on physiologic and anthropometric risk profiles and related clinical outcomes in adults with DM 2. We performed a comprehensive literature search using four computerized English and Indian scientific databases. The search was restricted to original studies (1970-2006) that evaluated the metabolic and clinical effects of yoga in adults with DM 2. Studies targeting clinical populations with cardiovascular disorders that included adults with comorbid DM were also evaluated. Data were extracted regarding study design, setting, target population, intervention, comparison group or condition, outcome assessment, data analysis and presentation, follow-up, and key results, and the quality of each study was evaluated according to specific predetermined criteria. We identified 25 eligible studies, including 15 uncontrolled trials, 6 non-randomized controlled trials and 4 randomized controlled trials (RCTs). Overall, these studies suggest beneficial changes in several risk indices, including glucose tolerance and insulin sensitivity, lipid profiles, anthropometric characteristics, blood pressure, oxidative stress, coagulation profiles, sympathetic activation and pulmonary function, as well as improvement in specific clinical outcomes. Yoga may improve risk profiles in adults with DM 2, and may have promise for the prevention and management of cardiovascular complications in this population. However, the limitations characterizing most studies preclude drawing firm conclusions. Additional high-quality RCTs are needed to confirm and further elucidate the effects of standardized yoga programs in populations with DM 2.


NATIONAL PATTERNS AND CORRELATES OF COMPLEMENTARY AND ALTERNATIVE MEDICINE USE IN ADULTS WITH DIABETES.

Garrow D, Egede LE

OBJECTIVE: The aim of this study was to determine national patterns and correlates of complementary and alternative medicine (CAM) use among adults with diabetes. METHODS: The authors compared CAM use in 2474 adults with and 28,625 adults without diabetes who participated in the most comprehensive national survey on CAM use (2002 National Health Interview Survey). Eight CAM use categories were created, including dietary, herbal, chiropractic, yoga, relaxation, vitamin, prayer, and other (acupuncture, Ayurveda, biofeedback, chelation, energy healing or Reiki therapy, hypnosis, massage, naturopathy, and homeopathy). An overall CAM use category also was created that excluded vitamins and prayer. Patterns of use were compared with chi-square and independent correlates of CAM use with multiple logistic regression controlling for relevant covariates. STATA was used for analysis to account for the complex survey design. RESULTS: Prevalence of overall use of CAM did not differ significantly by diabetes status (47.6 versus 47.9%, p = 0.81). Diabetes was not an independent predictor of overall use of CAM (OR 0.93, 95% confidence interval [CI] 0.83, 1.05). However, persons with diabetes were more likely to use prayer (OR 1.19, 95% CI 1.05, 1.36), but less likely to use herbs (OR 0.86, 95% CI 0.75, 0.99), yoga (OR 0.56, 95% CI 0.43, 0.72), or vitamins (OR 0.82, 95% CI 0.72, 0.93) than people without diabetes after controlling for relevant covariates. Independent correlates of overall use of CAM differed by age, income, employment, comorbidity, and health status between people with and without diabetes. CONCLUSIONS: This study found that there has been a dramatic increase in overall use of CAM in adults with diabetes; diabetes was not an independent predictor of overall use of CAM; and people with diabetes were more likely to use prayer, but less likely to use herbs, yoga, or vitamins compared to persons without diabetes.
ROLE OF YOGA IN DIABETES.
Sahay BK.
The science of yoga is an ancient one. It is a rich heritage of our culture. Several older books make a mention of the usefulness of yoga in the treatment of certain diseases and preservation of health in normal individuals. The effect of yogic practices on the management of diabetes has not been investigated well. We carried out well designed studies in normal individuals and those with diabetes to assess the role of yogic practices on glycaemic control, insulin kinetics, body composition exercise tolerance and various co-morbidities like hypertension and dyslipidemia. These studies were both short term and long-term. These studies have confirmed the useful role of yoga in the control of diabetes mellitus. Fasting and postprandial blood glucose levels came down significantly. Good glycaemic status can be maintained for long periods of time. There was a lowering of drug requirement and the incidence of acute complications like infection and ketosis was significantly reduced. There were significant changes in the insulin kinetics and those of counter-regulatory hormones like cortisol. There was a decrease in free fatty acids. There was an increase in lean body mass and decrease in body fat percentage. The number of insulin receptors was also increased. There was an improvement in insulin sensitivity and decline in insulin resistance. All these suggest that yogic practices have a role even in the prevention of diabetes. There is a beneficial effect on the co-morbid conditions like hypertension and dyslipidemia.

PERIPHERAL NEUROPATHY: PATHOGENIC MECHANISMS AND ALTERNATIVE THERAPIES.
Head KA.
Peripheral neuropathy (PN), associated with diabetes, neurotoxic chemotherapy, human immunodeficiency virus (HIV)/antiretroviral drugs, alcoholism, nutrient deficiencies, heavy metal toxicity, and other etiologies, results in significant morbidity. Conventional pain medications primarily mask symptoms and have significant side effects and addiction profiles. However, a widening body of research indicates alternative medicine may offer significant benefit to this patient population. Alpha-lipoic acid, acetyl-L-carnitine, benfotiamine, methylcobalamin, and topical capsaicin are among the most well-researched alternative options for the treatment of PN. Other potential nutrient or botanical therapies include vitamin E, glutathione, folate, pyridoxine, biotin, myo-inositol, omega-3 and -6 fatty acids, L-arginine, L-glutamine, taurine, N-acetylcysteine, zinc, magnesium, chromium, and St. John’s wort. In the realm of physical medicine, acupuncture, magnetic therapy, and yoga have been found to provide benefit. New cutting-edge conventional therapies, including dual-action peptides, may also hold promise.

EFFECT OF YOGA BASED LIFESTYLE INTERVENTION ON STATE AND TRAIT ANXIETY.
Gupta N, Khera S, Vempati RP, Sharma R, Bijlani RL.
Considerable evidence exists for the place of mind body medicine in the treatment of anxiety disorders. Excessive anxiety is maladaptive. It is often considered to be the major component of unhealthy lifestyle that contributes significantly to the pathogenesis of not only psychiatric but also many other systemic disorders. Among the approaches to reduce the level of anxiety has been the search for healthy lifestyles. The aim of the study was to study the short-term impact of a comprehensive but brief lifestyle intervention, based on yoga, on anxiety levels in normal and diseased subjects. The study was the result of operational research carried out in the Integral Health Clinic (IHC) at the Department of Physiology of All India Institute of Medical Sciences. The subjects had history of hypertension, coronary artery disease, diabetes mellitus, obesity, psychiatric disorders
(depression, anxiety, 'stress'), gastrointestinal problems (non ulcer dyspepsia, duodenal ulcers, irritable bowel disease, Crohn's disease, chronic constipation) and thyroid disorders (hyperthyroidism and hypothyroidism). The intervention consisted of asanas, pranayama, relaxation techniques, group support, individualized advice, and lectures and films on philosophy of yoga, the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness. The outcome measures were anxiety scores, taken on the first and last day of the course. Anxiety scores, both state and trait anxiety were significantly reduced. Among the diseased subjects significant improvement was seen in the anxiety levels of patients of hypertension, coronary artery disease, obesity, cervical spondylitis and those with psychiatric disorders. The observations suggest that a short educational programme for lifestyle modification and stress management leads to remarkable reduction in the anxiety scores within a period of 10 days.


THE BENEFICIAL EFFECT OF YOGA IN DIABETES.

Malhotra V, Singh S, Tandon OP, Sharma SB.

Twenty NIDDM subjects (mild to moderate diabetics) in the age group of 30-60 years were selected from the out patient clinic of G.T.B. hospital. They were on a 40 days yoga asana regime under the supervision of a yoga expert. 13 specific Yoga asanas < or = done by Type 2 Diabetes Patients included. Surya Namaskar, Trikonasana, Tadasana, Sukhasana, Padmasana, Bhashrika Pranayama, Pashimottanasana, Ardhmatyendrasana, Pawanmuktasana, Bhujangasana, Vajrasana, Dhanurasana and Shavasana are beneficial for diabetes mellitus. Serum insulin, plasma fasting and one hour postprandial blood glucose levels and anthropometric parameters were measured before and after yoga asanas. The results indicate that there was significant decrease in fasting glucose levels from basal 208.3 +/- 20.0 to 171.7 +/- 19.5 mg/dl and one hour postprandial blood glucose levels decreased from 295.3 +/- 22.0 to 269.7 +/- 19.9 mg/dl. The exact mechanism as to how these postures and controlled breathing interact with somatoendocrine mechanism affecting insulin kinetics was worked out. A significant decrease in waist-hip ratio and changes in insulin levels were also observed, suggesting a positive effect of yoga asanas on glucose utilisation and fat redistribution in NIDDM. Yoga asanas may be used as an adjunct with diet and drugs in the management of Type2diabetes.


USAGE OF AND COST OF COMPLEMENTARY/ALTERNATIVE MEDICINE IN DIABETIC PATIENTS.

Moolasarn S, Sripa S, Kuessirikiet V et al

The purposes of the present survey research in diabetic patients were 1) to determine characteristics of complementary/alternative medicine (CAM) use, 2) to identify factors related to CAM use such as sociodemographic, adverse effects, and quality of life, and 3) to determine differences between patients who used and did not use CAM. The data was collected through developed questionnaires and SF-36 scale Thai version. Samples were 159 diabetes patients over 18 years of age or older who came for treatment at Suppasitthiprasong Hospital, Ubon Ratchathani Province, Thailand. The results indicated that the prevalence of CAM use was rather high (47.8%). The most common types of CAM used were yoga/exercise (32.8%), unchanged form of herbal medicine (29.9%), and changed form herbal medicine (17.8%). The average expense of CAM use was dollar 8.58 per person per month. Thus, if the percentage of CAM use and the cost were true for other Thai diabetic patients throughout Thailand, CAM use expenditure for the whole country would be about dollar 915,250-1,545,750 per month, which is quite high for a small country like Thailand. Most patients (64.4%) who used CAM did not inform their doctors about their CAM use. Results also indicated that government official patients were more likely to use CAM than those of farmer patients significantly (p-value = 0.03, odds ratio =
In addition, the present study found that patients who had a higher income were more likely to use CAM than those of lower income patients significantly (p-value = 0.04, odds ratio = 1.01). However, other factors such as age, sex, marital status, level of education, health insurance coverage status, duration of time to treat, occurrence of adverse effects, and quality of life were not different between the patients who used CAM and who did not use CAM. Physicians should pay more attention to the CAM use of patients since they used CAM without informing physicians and some herbal medicines may cause hypoglycemia. However, the study results had some limitations to apply to other Thai populations since the sample were Suppasitthiprasong patients who may be different from other Thai populations in many ways such as their local culture, belief, and CAM use types and cost.


THE ROLE OF COMPLEMENTARY AND ALTERNATIVE MEDICINE IN DIABETES.
Dham S, Shah V, Hirsch S, Banerji MA.

Complementary and alternative medicine (CAM) describes a diverse group of medical and health care systems, practices, and products not currently considered to be part of conventional medicine. Inadequacies in current treatments for diabetes have led 2 to 3.6 million Americans to use CAM for diabetes treatment, despite limited studies of safety and efficacy of CAM methods. CAM is used mostly by West Indians, Africans, Indians, Latin Americans, or Asians. Prayer, acupuncture, massage, hot tub therapy, biofeedback, and yoga have been used as well as various plant remedies for treating diabetes. Several CAM practices and herbal remedies are promising for diabetes treatment, but further rigorous study is needed in order to establish safety, efficacy, and mechanism of action. In the meantime, it is important to be aware that many patients with diabetes may be using CAM and to consider potential interactions with conventional medicines being used.


AN INVESTIGATION INTO THE ACUTE AND LONG-TERM EFFECTS OF SELECTED YOGIC POSTURES ON FASTING AND POSTPRANDIAL GLYCEMIA AND INSULINEMIA IN HEALTHY YOUNG SUBJECTS.
Manjunatha S, Vempati RP, Ghosh D, Bijlani RL.

The study was conducted to examine the hypothesis that yogasanas help in the treatment of diabetes mellitus by releasing insulin from the pancreas. Twenty healthy young volunteers (17 male, 3 female; age 19-31 years) participated in the study. Each volunteer performed four sets of asanas in random order for 5 consecutive days each with a 2-day gap between consecutive sets of asanas. The four sets of asanas were: (I) dhanurasana + matsyendrasana, (II) halasana + vajrasana, (III) naukasana + bhujangasana, and (IV) setubandhasana + pavanamuktasana. Blood samples were collected on days 4 and 5 of each set of asanas for measurement of glucose and insulin levels before the asanas, within 10 min after performing the asanas, and 30 min after ingestion of 75 g glucose, which in turn was ingested immediately after the second blood sample. A standard 75 g oral glucose tolerance test (OGTT) was also done before and after the study. On the days of the pre-study or post-study OGTT, no asanas were done. The serum insulin levels after the asanas were lower (P<0.05) than those before the asanas. However, the serum insulin level 0.5 h after the post-asana oral 75 g-glucose challenge was higher (P<0.05) in Set IV than the 0.5 h postprandial insulin level in the pre-study OGTT; the same trend was observed in other sets as well although statistically not significant. The observations suggest that the performance of asanas led to increased sensitivity of the B cells of pancreas to the glucose signal. The increased sensitivity seems to be a sustained change resulting from a progressive long-term effect of asanas. The study is significant in that it has for the first time attempted to probe the mechanism by which yogasanas help diabetes mellitus.
ASSOCIATION BETWEEN COMPLEMENTARY AND ALTERNATIVE MEDICINE USE, PREVENTIVE CARE PRACTICES, AND USE OF CONVENTIONAL MEDICAL SERVICES AMONG ADULTS WITH DIABETES.

Garrow D, Egede LE

OBJECTIVE: To assess the association between complementary and alternative medicine (CAM) use, preventive care practices, and use of conventional medical services among adults with diabetes.

RESEARCH DESIGN AND METHODS: We analyzed data on 2,474 adults with diabetes. We created an overall CAM-use category based on use of any of the following: diets, herbs, chiropractic care, yoga, relaxation, acupuncture, ayurveda, biofeedback, chelation, energy healing, Reiki therapy, hypnosis, massage, naturopathy, and homeopathy. We used multiple logistic regression to assess the effect of CAM use on preventive care practices (receipt of influenza and pneumonia vaccines) and use of conventional medical services (number of primary care and emergency department visits). STATA was used for statistical analysis to account for the complex survey design.

RESULTS: A total of 48% of adults with diabetes used some form of CAM. CAM use was independently associated with receipt of pneumonia vaccination (odds ratio 1.56 [95% CI 1.26-1.94]) but not significantly associated with receipt of influenza vaccination (1.17 [0.92-1.48]). CAM use was independently associated with visiting the emergency department (1.34 [1.06-1.70]), having six or more primary care visits (1.44 [1.14-1.83]), and having eight or more primary care visits (1.66 [1.22-2.25]).

CONCLUSIONS: In contrast to the findings of previous studies, CAM use appears to be associated with increased likelihood of receipt of preventive care services and increased emergency department and primary care visits. CAM use may not be a barrier to use of conventional medical services in adults with diabetes.

A BRIEF BUT COMPREHENSIVE LIFESTYLE EDUCATION PROGRAM BASED ON YOGA REDUCES RISK FACTORS FOR CARDIOVASCULAR DISEASE AND DIABETES MELLITUS.

Bijlani RL, Vempati RP, Yadav RK et al

OBJECTIVES: The objective of the study was to study the short-term impact of a brief lifestyle intervention based on yoga on some of the biochemical indicators of risk for cardiovascular disease and diabetes mellitus.

DESIGN: The variables of interest were measured at the beginning (day 1) and end (day 10) of the intervention using a pre-post design.

SETTING: The study is the result of operational research carried out in our Integral Health Clinic (IHC). The IHC is an outpatient facility which conducts 8-day lifestyle modification programs based on yoga for prevention and management of chronic disease. A new course begins every alternate week of the year.

SUBJECTS: The study is based on data collected on 98 subjects (67 male, 31 female), ages 20-74 years, who attended one of our programs. The subjects were a heterogeneous group of patients with hypertension, coronary artery disease, diabetes mellitus, and a variety of other illnesses.

INTERVENTION: The intervention consisted of asanas (postures), pranayama (breathing exercises), relaxation techniques, group support, individualized advice, lectures and films on the philosophy of yoga and the place of yoga in daily life, meditation, stress management, nutrition, and knowledge about the illness.

OUTCOME MEASURES: The outcome measures were fasting plasma glucose and serum lipoprotein profile. These variables were determined in fasting blood samples, taken on the first and last day of the course.

RESULTS: Fasting plasma glucose, serum total cholesterol, low-density lipoprotein (LDL) cholesterol, very-LDL cholesterol, the ratio of total cholesterol to high density lipoprotein (HDL) cholesterol, and total triglycerides were significantly lower, and HDL cholesterol significantly higher, on the last day of the course compared to the first day of the course. The changes were more marked in subjects with hyperglycemia or hypercholesterolemia.

CONCLUSIONS: The observations suggest that a short lifestyle
modification and stress management education program leads to favorable metabolic effects within a period of 9 days.


YOGA AS A THERAPEUTIC INTERVENTION: A BIBLIOGRAPHIC ANALYSIS OF PUBLISHED RESEARCH STUDIES.
Khalsa SB.
Although yoga is historically a spiritual discipline, it has also been used clinically as a therapeutic intervention. A bibliometric analysis on the biomedical journal literature involving research on the clinical application of yoga has revealed an increase in publication frequency over the past 3 decades with a substantial and growing use of randomized controlled trials. Types of medical conditions have included psychopathological (e.g. depression, anxiety), cardiovascular (e.g. hypertension, heart disease), respiratory (e.g. asthma), diabetes and a variety of others. A majority of this research has been conducted by Indian investigators and published in Indian journals, particularly yoga specialty journals, although recent trends indicate increasing contributions from investigators in the U.S. and England. Yoga therapy is a relatively novel and emerging clinical discipline within the broad category of mind-body medicine, whose growth is consistent with the burgeoning popularity of yoga in the West and the increasing worldwide use of alternative medicine.


ROLE OF YOGA IN MODIFYING CERTAIN CARDIOVASCULAR FUNCTIONS IN TYPE 2 DIABETIC PATIENTS.
Singh S, Malhotra V, Singh KP, Madhu SV, Tandon OP.
OBJECTIVES: 1. To study the effect of forty days of Yogic exercises on cardiac functions in Type 2 Diabetics. 2. To study the effect of forty days of Yogic exercises on blood glucose level, glycosylated hemoglobin. METHODS: The present study done in twenty-four Type 2 DM cases provides metabolic and clinical evidence of improvement in glycaemic control and autonomic functions. These middle-aged subjects were type II diabetics on antihyperglycaemic and dietary regimen. Their baseline fasting and postprandial blood glucose and glycosylated Hb were monitored along with autonomic function studies. The expert gave these patients training in yoga asanas and they pursued those 30-40 min/day for 40 days under guidance. These asanas consisted of 13 well known postures, done in a sequence. After 40 days of yoga asanas regimen, the parameters were repeated. RESULTS: The results indicate that there was significant decrease in fasting blood glucose levels from basal 190.08 +/- 18.54 in mg/dl to 141.5 +/- 16.3 in mg/dl after yoga regimen. The post prandial blood glucose levels decreased from 276.54 +/- 20.62 in mg/dl to 201.75 +/- 21.24 in mg/dl, glycosylated hemoglobin showed a decrease from 9.03 +/- 0.29% to 7.83 +/- 0.53% after yoga regimen. The pulse rate, systolic and diastolic blood pressure decreased significantly (from 86.45 +/- 2.0 to 77.65 +/- 2.5 pulse/min, from 142.0 +/- 3.9 to 126.0 +/- 3.2 mm of Hg and from 86.7 +/- 2.5 mm of Hg to 75.5 +/- 2.1 mm of Hg after yoga regimen respectively). Corrected QT interval (QTc) decreased from 0.42 +/- 0.0 to 0.40 +/- 0.0. CONCLUSION: These findings suggest that better glycaemic control and stable autonomic functions can be obtained in Type 2 DM cases with yoga asanas and pranayama. The exact mechanism as to how these postures and controlled breathing interact with somato-neuro-endocrine mechanism affecting metabolic and autonomic functions remains to be worked out.


STUDY OF YOGA ASANAS IN ASSESSMENT OF PULMONARY FUNCTION IN NIDDM PATIENTS.
Malhotra V, Singh S, Singh KP, Gupta P, Sharma SB, Madhu SV, Tandon OP.
Certain yoga asanas if practiced regularly are known to have beneficial effects on human body. These yoga practices might be interacting with various, somato-neuro-endocrine mechanisms to have therapeutic effects. The present study done in twenty four NIDDM patients of 30 to 60 year old, provides metabolic and clinical evidence of improvement in glycaemic control and pulmonary functions. These middle-aged subjects were type II diabetics on antihyperglycaemic and dietary regimen. Their baseline fasting and postprandial blood glucose and glycosylated Hb were monitored along with pulmonary function studies. The expert gave these patients training in yoga asanas and were purshed 30-40 min/day for 40 days under guidance. These asanas consisted of 13 well known postures, done in a sequence. After 40 days of yoga asanas regimen, the parameters were repeated. The results indicate that there was significant decrease in fasting blood glucose levels (basal 190.08 +/- 90.8 in mg/dl to 141.5 +/- 79.8 in mg/dl). The postprandial blood glucose levels also decreased (276.54 +/- 101.0 in mg/dl to 201.75 +/- 104.1 in mg/dl), glycosylated hemoglobin showed a decrease (9.03 +/- 1.4% to 7.83 +/- 2.6%). The FEV1, FVC, PEFR, MVV increased significantly (1.81 +/- 0.4 lt to 2.08 +/- 0.4 lt, 2.20 +/- 0.6 lt to 2.37 +/- 0.5 lt, 3.30 +/- 1.0 lt/s to 4.43 +/- 1.4 lt/s and 64.59 +/- 25.7 lt min to 76.28 +/- 28.1 lt/min respectively). FEV1/FVC% improved (85 +/- 0.2% to 89 +/- 0.1%). These findings suggest that better glycaemic control and pulmonary functions can be obtained in NIDDM cases with yoga asanas and pranayama. The exact mechanism as to how these postures and controlled breathing, interact with somato-neuro-endocrine mechanism affecting metabolic and pulmonary functions remains to be worked out.


AYURVEDA FOR DIABETES MELLITUS: A REVIEW OF THE BIOMEDICAL LITERATURE.

Elder C.

Diabetes mellitus is a condition that is extremely serious from both clinical and public health standpoints. The traditional healthcare system of India, Ayurveda, offers a balanced and holistic multi-modality approach to treating this disorder. Many Ayurvedic modalities have been subjected to empirical scientific evaluation, but most such research has been done in India, receiving little attention in North America. This paper offers a review of the English language literature related to Ayurveda and diabetes care, encompassing herbs, diet, yoga, and meditation as modalities that are accessible and acceptable to Western clinicians and patients. There is a considerable amount of data from both animal and human trials suggesting efficacy of Ayurvedic interventions in managing diabetes. However, the reported human trials generally fall short of contemporary methodological standards. More research is needed in the area of Ayurvedic treatment of diabetes, assessing both whole practice and individual modalities.


EFFECT OF YOGA ASANAS ON NERVE CONDUCTION IN TYPE 2 DIABETES.

Malhotra V, Singh S, Tandon OP, Madhu SV, Prasad A, Sharma SB.

Twenty Type 2 diabetic subjects between the age group of 30-60 years were studied to see the effect of 40 days of Yoga asanas on the nerve conduction velocity. The duration of diabetes ranged from 0-10 years. Subject suffering from cardiac, renal and proliferative retinal complications were excluded from the study Yoga asanas included Suryanamaskar, Tadasan, Konasan, Padmasan Pranayam, Paschimottansan Ardhamatsyendrasan, Shavasan, Pavanmukthasans, Sarpsan and Shavasana. Subjects were called to the cardio-respiratory laboratory in the morning time and were given training by the Yoga expert. The Yoga exercises were performed for 30-40 minutes every day for 40 days in the above sequence. The subjects were prescribed certain medicines and diet. The basal blood glucose, nerve conduction velocity of the median nerve was measured and repeated after 40 days of Yogic regime. Another group of 20 Type 2 diabetes subjects of comparable age and severity, called the control group, were kept on prescribed medication and light physical
exercises like walking. Their basal & post 40 days parameters were recorded for comparison. Right hand and left hand median nerve conduction velocity increased from 52.81 +/- 1.1 m/sec to 53.87 +/- 1.1 m/sec and 52.46 +/- 1.0 to 54.75 +/- 1/1 m/sec respectively. Control group nerve function parameters deteriorated over the period of study, indicating that diabetes is a slowly progressive disease involving the nerves. Yoga asanas have a beneficial effect on glycaemic control and improve nerve function in mild to moderate Type 2 diabetes with sub-clinical neuropathy.


A STUDY OF RESPONSE PATTERN OF NON-INSULIN DEPENDENT DIABETICS TO YOGA THERAPY.
Jain SC, Uppal A, Bhatnagar S0, Talukdar B.

Changes in blood glucose and glucose tolerance by oral glucose tolerance test (OGTT) after 40 days of yoga therapy in 149 non-insulin-dependent diabetics (NIDDM) were investigated. The response to yoga in these subjects was categorized according to a severity scale index (SSI) based on area index total (AIT) under OGTT curve. One hundred and four patients showed a fair to good response to the yoga therapy. There was a significant reduction in hyperglycemia and AIT with decrease in oral hypoglycemia and AIT with decrease in oral hypoglycemic drugs required for maintenance of normoglycemia. It is concluded that yoga, a simple and economical therapy, may be considered a beneficial adjuvant for NIDDM patients.


YOGA PRACTICE IN DIABETES IMPROVES PHYSICAL AND PSYCHOLOGICAL OUTCOMES.
Kosuri M, Sridhar GR.

BACKGROUND: The aim of this study was to examine the effect of yoga practice on clinical and psychological outcomes in subjects with type 2 diabetes mellitus (T2DM). METHODS: In a 40-day yoga camp at the Institute of Yoga and Consciousness, ambulatory subjects with T2DM not having significant complications (n = 35) participated in a 40-day yoga camp, where yogic practices were overseen by trained yoga teachers. Clinical, biochemical, and psychological well-being were studied at baseline and at the end of the camp. RESULTS: At the end of the study, there was a reduction of body mass index (BMI) (26.514 +/- 3.355 to 25.771 +/- 3.40; P < 0.001) and anxiety (6.20 +/- 3.72 to 4.29 +/- 4.46; P < 0.05) and an improvement in total general well-being (48.6 +/- 11.13 to 52.66 +/- 12.87; P < 0.05). CONCLUSIONS: Participation of subjects with T2DM in yoga practice for 40 days resulted in reduced BMI, improved well-being, and reduced anxiety.


EFFECT OF YOGA-NIDRA ON BLOOD GLUCOSE LEVEL IN DIABETIC PATIENTS.
Amita S, Prabhakar S, Manoj I, Harminder S, Pavan T.

Diabetes is a metabolic disorder, which has become a major health challenge worldwide. South East Asian countries have a highest burden of diabetes. In India the prevalence of diabetes is rising rapidly especially in the urban population because of increasing obesity and reduced physical activity. An objective of this study is to evaluate the effect of Yoga-Nidra on blood glucose level in diabetic patients. This study was conducted on 41, middle aged, type-2 diabetic patients, who were on oral hypoglycaemic. These patients were divided in to two groups: (a) 20 patients on oral hypoglycaemic with yoga-nidra, and (b) 21 were on oral hypoglycaemic alone. Yoga-nidra practiced for 30 minutes daily up to 90 days, parameters were recorded every 30th day. Results of this study showed that most of the symptoms were subsided (P < 0.004, significant), and fall of mean blood glucose level was significant after 3-month of Yoga-nidra. This fall was 21.3 mg/dl, P < 0.0007, (from 159 +/- 12.27 to 137.7 +/- 23.15) in fasting and 17.95 mg/dl, P = 0.02, (from 255.45 +/- 16.85 to 237.5 +/- 30.54) in post prandial glucose level. Results of this study
suggest that subjects on Yoga-nidra with drug regimen had better control in their fluctuating blood glucose and symptoms associated with diabetes, compared to those were on oral hypoglycaemics alone.

Evid Based Complement Alternat Med. 2009 Aug 18

UTILIZATION OF 3-MONTH YOGA PROGRAM FOR ADULTS AT HIGH RISK FOR TYPE 2 DIABETES: A PILOT STUDY.
Yang K, Bernardo LM, Sereika SM, Conroy MB, Balk J, Burke LE.
Various modes of physical activity, combined with dieting, have been widely recommended to prevent or delay type 2 diabetes. Among these, yoga holds promise for reducing risk factors for type 2 diabetes by promoting weight loss, improving glucose levels and reducing blood pressure and lipid levels. This pilot study aimed to assess the feasibility of implementing a 12-week yoga program among adults at high risk for type 2 diabetes. Twenty-three adults (19 Whites and 4 non-Whites) were randomly assigned to the yoga intervention group or the educational group. The yoga group participated in a 3-month yoga intervention with sessions twice per week and the educational group received general health educational materials every 2 weeks. All participants completed questionnaires and had blood tests at baseline and at the end of 3 months. Effect sizes were reported to summarize the efficacy of the intervention. All participants assigned to the yoga intervention completed the yoga program without complication and expressed high satisfaction with the program (99.2%). Their yoga session attendance ranged from 58.3 to 100%. Compared with the education group, the yoga group experienced improvements in weight, blood pressure, insulin, triglycerides and exercise self-efficacy indicated by small to large effect sizes. This preliminary study indicates that a yoga program would be a possible risk reduction option for adults at high risk for type 2 diabetes. In addition, yoga holds promise as an approach to reducing cardiometabolic risk factors and increasing exercise self-efficacy for this group.


THE NEW WORLD OF MEDICINE: PROSPECTING FOR HEALTH.
Go VL, Champaneria MC.
Throughout past millennia, human beings have shared the common goal of improving health for longevity. However, different cultures around the world have developed their own approaches to achieve this goal. Various traditions have emerged, rendering distinct medical systems such as Ayurveda, Yoga, Chinese-Japanese medicine, shamanism, and Native American healing. Traditional medicine involves a holistic approach to the human body to integrate healing with culture, environment, and tradition. Modern allopathic medicine originated from Greco-Roman Medicine and Northern European traditions and is built on the science of anatomy, physiology, and biochemistry and the structure-function relationship between cells, tissues, and organs. This foundation focuses on diagnosis, treatment, and cure for acute illnesses via potent pharmaceutical drugs, surgery, radiation, and other treatment modalities. Within this past century, we have doubled the life-span of human beings. Genomic medicine, including stem cell research, cloning, and gene therapy, will increase our capability to treat even more diseases. In the new millennium, we face more chronic illnesses related to aging, environment, and lifestyle, such as cancer, diabetes, osteoporosis, and cardiovascular diseases. Thus, health care providers face the challenge of prospecting for health and disease prevention. Modern science and medical advancements provide the rationale for the integration of various traditional healing techniques, which have been termed Alternative and Complementary Medicine, to promote healing, health, and longevity. Advances in medicine must include the holistic approach of traditional medicine to face the current challenges in health care. Therefore, the New World of Medicine must fuse the antiquity of ancient healing with the innovations of modern medicine to increase life-expectancy and improve quality of life throughout the world.