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1. Abhijit Ghadge, Shubhangi Harke, Suresh Khadke, Arundhati Diwan, Madhu Pankaj, Abhay Harsulkar and Aniket Kuvalekar. “Gender Dependent Effects of Glycemic Status and Disease Duration on Biochemical Markers in Type 2 Diabetes: A Pilot Study”. *Clinical and Experimental Pharmacology and Physiology*, ISSN No.: 1440-1681

2. Abhijit Ghadge, Abhay Harsulakr, Arundhati Diwan and Aniket Kuvalekar. “Expression of Lipid Metabolism Genes and their Transcription Factors is modulated in Blood Mononuclear Cells of Type 2 Diabetic Patients”. *Experimental and Clinical Endocrinology and Diabetes*, ISSN No.: 0947-7349
Controversy of oral hypoglycemic agents in type 2 diabetes mellitus: Novel move towards combination therapies

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ABSTRACT

Aim: As diabetes mellitus is multi-factorial disease, use of several oral hypoglycemic agents (OHAs) is the main stay of pharmacological treatment. The treatment has become more difficult and challenging as OHAs are heterogeneous in their mode of action that causes unwanted side effects. Complementary approaches such as use of medicinal plants and dietary polyunsaturated fatty acids (PUFA) with hypoglycemic and hypolipidemic activities are therefore imperative. A vast literature has independently documented the effects of OHAs, medicinal plants and PUFA for the management of diabetes. In the present review, we have compiled the current literature to describe the effects of commonly used OHAs, their mechanisms of action and reported controversies. The antidiabetic potential of herbs and/or formulations and omega-3 PUFA with its potential benefits, mode of action is also documented.

Methods: PUBMED, MEDLINE, Cochrane Library etc., were searched for relevant articles using appropriate terms (until February 2015). Human and animal studies were selected for the review. Data extraction was carried out by one author and checked by second author.

Results: The present review concerns about the safety profile of OHAs. Medicinal herbs with hypoglycemic activities are increasingly sought because of its natural origin, active constituents and minimal side effects. The current literature suggests that supplementation with PUFA improves macro- and microvascular complications.

Conclusions: There is a need for best possible individualized treatment based on variations in biochemical parameters with combinational therapy of nutritional/herbal supplementations. Such a combination may be helpful for better management of diabetes and its complications.
Comparative anti-inflammatory and lipidnormalizing effects of metformin and omega-3 fatty acids through modulation of transcription factors in diabetic rats

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ABSTRACT

Background: Emerging evidence suggests beneficial effects of omega-3 fatty acids on diabetic complications. The present study compared the progressive effects of metformin and flax/fish oil on lipid metabolism, inflammatory markers, and liver and renal function test markers in streptozotocin-nicotinamide-induced diabetic rats.

Methods: Streptozotocin-induced diabetic rats were randomized into control and four diabetic groups: streptozotocin (STZ), metformin (200 mg/kg body weight (b.w)/day (D)), flax and fish oil (500 mg/kg b.w/D).

Results: Metformin and flax and fish oil exhibited increased expression of transcription factor peroxisome proliferator-activated receptor γ while the treatment downregulated sterol regulatory element-binding protein 1 and nuclear factor κB as compared to those of the STZ group. Apart from modulation of transcription factor expression, the expression of fatty acid synthase, long chain acyl CoA synthase, and malonyl-CoA-acyl carrier protein transacylase was lowered by flax/fish oil treatment. Serum cholesterol, triglycerides, and VLDL were also significantly reduced in the treatment groups as compared to those in the STZ group. Although pathological abnormalities were seen in the liver and kidneys of rats on metformin, no significant changes in liver/renal function markers were observed at day 15 and day 30 of the treatment groups. Flax/fish oil had protective effects toward pathological abnormalities in the liver and kidney. Flax/fish oil improved lipid profile and alkaline phosphatase at day 30 as compared to that at day 15.

Conclusions: The present study demonstrates potential beneficial effects of metformin and flax/fish oil intervention in improving serum lipid profile by regulating the expression of transcription factors and genes involved in lipid metabolism in diabetic rats. In addition, these interventions also lowered the expression of atherogenic cytokines. The protective effects of flax/fish oil are worth investigating in human subjects on metformin monotherapy.
ABSTRACT

Objective: The present study analyzed the effects of antidiabetic drugs on antioxidant enzymes and liver function test (LFT) markers and their association with homeostatic model assessment of insulin resistance (HOMA-IR) in type 2 diabetic subjects.

Methods: We assessed healthy and diabetic subjects (100 each). Diabetic subjects were divided based on treatment with only metformin, metformin in combination with other antidiabetic drugs and insulin in combination with other antidiabetic drugs. LFT markers, antioxidant status and HOMA-IR were assessed in the subjects.

Results: Superoxide dismutase activity was higher (p<0.01) while catalase activity was lower (p<0.01) in the diabetic subjects as compared to controls. Serum glutamate-pyruvate transaminase (SGPT) (p<0.01) and bilirubin (p<0.05) levels were higher in diabetic male subjects while urea (p<0.05) levels were lower and SGPT (p<0.01) levels were higher in diabetic female subjects. In male subjects consuming only metformin, a positive association between HOMA-IR and insulin (p<0.05) was seen. A positive association between HOMA-IR and glucose (p<0.01), insulin (p<0.01), SOD (p<0.01) and SGPT (p<0.05) was seen in males receiving metformin with other drugs. Interestingly, the female subjects on metformin displayed a positive association between HOMA-IR and insulin (p<0.05) only. A positive association of HOMA-IR with glucose (p<0.01) and insulin (p<0.05) was seen in females on metformin in combination with other anti-diabetic drugs.

Conclusion: The alterations in the antioxidant enzyme activities and liver function tests are dependent upon the gender and glycemic status of subjects while the variations in correlations of HOMA-IR with antioxidant enzymes, liver function tests and inflammatory markers are dependent on type of treatments.
Circulatory adipocytokines and lipid profile variations in type-2 diabetic subjects: Desirable side-effects of antidiabetic drugs

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ABSTRACT

Aim: Inspite of availability of a variety of drugs to treat type 2 diabetes, little is known about their effects on other systems. Normalization of glucose metabolism by these drugs may consequently affect the secretory function in adipocytes. Secretory adipocytokines like adiponectin and leptin are emerging as novel therapeutic targets for type 2 diabetes mellitus (T2DM). The present study was undertaken to analyze the effects of commonly used Oral Hypoglycemic Agents (OHAs) alone, or in combination with other drugs and/or insulin on circulatory adiponectin and leptin levels, lipid profile, and blood pressure in diabetic subjects.

Methods: The study was undertaken at IRSHA and Bharati Vidyapeeth Medical College and Hospital, MS, India. Clinically diagnosed T2DM subjects and age, gender matched healthy controls were recruited. Fasting blood was collected from each subject and the blood samples were analyzed for circulatory adipocytokines and lipid parameters using commercial kits.

Results: Serum adiponectin levels were significantly increased while leptin significantly decreased in diabetic men (p < 0.05) and women (p < 0.001) on OHA, as compared to healthy controls. Triglyceride levels significantly decreased (p < 0.05) in diabetic men, however, they remained unchanged in women despite same drug treatment. Serum HDL and LDL levels (p < 0.001) were significantly lower in diabetic women as compared to healthy women. Systolic (p < 0.05) and diastolic (p < 0.001) blood pressure was significantly high in diabetic men but remained unchanged in women.

Conclusions: Frequently used OHAs significantly improve circulatory levels of adipocytokines. Selecting best treatment option for each patient is a key, and 2012 European Association for the Study of Diabetes (EASD) and ADA guidelines recommend diabetes treatment to be individualized depending on various socioeconomic and lifestyle factors. We recommend regular analysis of circulatory adipocytokines in T2DM patients to help clinicians select the best treatment option to normalize levels of these important therapeutic targets.
Awareness towards type 2 diabetes mellitus in urban population of Pune, Maharashtra, India

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ABSTRACT

India has earned a dubious distinction of global diabetes capital. In this view, the present study was designed to assess awareness level of diabetes among the population of western Maharashtra. A cross-sectional study was carried out in and around Pune City. Normoglycemic adult Indian citizens were included in the study. About 49% of the population belonged to a group reporting increased incidence of type 2 diabetes mellitus (20-30 yrs.). With access to specialist treatment and income of individuals being positively correlated ($r^2=0.8$), awareness about regular health check-up was quite low (20%-35.71%). The 12% of subjects, who never had medical check-up, had at least two symptoms of metabolic disorder and 30% of these had family history of type 2 diabetes. Literacy level and knowledge about different methods of blood glucose checking were positively correlated ($r^2=0.96$). About 60% of the survey population believed that sweets or sugar intake causes diabetes. The study indicates an urgent need for raising awareness about this metabolic disorder in general population through all possible means to mitigate future burst and epidemiological burden.
AWARD
AWARD

1. “Travel Award of 800 USD” from the Korean Society for the Study of Obesity to participate in “43rd International Congress on Obesity and Metabolic Syndrome Organized by Korean Society for the Study of Obesity” for the poster entitled “Effects of Glycemic Status and Disease Duration on Type 2 Diabetes Mellitus: A Pilot Study” held at Seoul, South Korea on November 12th-14th, 2015.
PRESENTATIONS
INTERNATIONAL CONFERENCES

1. Poster presentation at “International Congress on Obesity and Metabolic Syndrome in conjunction with the 43rd Annual Scientific Meeting of KSSO” organized by ICOMES held at Seoul, South Korea for the poster entitled “Effects of Glycemic Status and Disease Duration on Type 2 Diabetes Mellitus: A Pilot Study” on November 12\textsuperscript{th}-14\textsuperscript{th}, 2015.

2. Oral presentation at “International Conference on Contemporary Research in Chemical and Life Sciences” organized by Sadguru Gadage Maharaj College held at Karad for the paper entitled “Effects of Omega-3 Fatty Acid Supplementation on Streptozotocin- Nicotinamide Induced Diabetic Rats” on April 22\textsuperscript{nd} & 23\textsuperscript{rd}, 2015.

NATIONAL CONFERENCES

3. Poster presentation at “National Conference on Recent trends in Cell biology, Biotechnology and Bioinformatics” organized by Department of Zoology, Balwant College held at Vita for the posters entitled “Analysis of Adipocytokines in Type-2 Diabetic Subjects from Pune, Maharashtra, India” on September 6\textsuperscript{th}-7\textsuperscript{th}, 2013.

CONSENT, PROFORMA AND DIETARY RECALL
रुग्णाचे अनुमती पत्र

संशोधनाचे नाव: डायबेटीस रुग्णांच्या रक्तातील जैवरासायनिक आणि रैण्वीय घटकांचा तौलोनिक अभ्यास

प्रमुख संशोधक:
डॉ. अनिकेत कुवळेकर, डॉ. ओंकार कुलकर्णी, डॉ. अशोक दिवाण, डॉ. डी. जी. भोसले, डॉ. डी. जी. भोसले, डॉ. काविता क्रिश्ना, डॉ. प्रीति देव, डॉ. मधु नागवंशी

संशोधनाचा उद्देश:
या संशोधनात सहभागी होण्यास विचारले आहे की ज्यामध्ये तुमच्या रक्तातील जैव-रासायनिक आणि रैण्वीय पृथक्करण करण्यात येईल यामध्ये विटामीन बी १२, फोलीक ऑसिड, होमोसीस्टीन, विटामीन ड, अडीपोलेक्टीन, लेपीटीन, लिपीड परोस्किडेशन, सुपर ऑक्सांड, डिसम्यूट्येज, कंटालेज, युरिया, ग्लूटाथिओपरोस्किडेश, ग्लायकोजन, प्रोटीन, इन्सुलीन आणि इंटरल्युकोजन ८ (आय.एल.८) या घटकांचे परीक्षण केले जाईल.

तुमच्या रक्तातील पेशीमधून आर.एन.ए. हा घटक वेगळा काढून त्याचा वापर इतर रैण्वीय परीक्षणांमध्ये केला जाईल

वापरली जाणारी पद्धती:
जर तुम्ही या संशोधनात सहभागी झालात तर डॉक्टर/परीचारिका तुमच्या हाताच्या शिरेतून ८ मिली रक्त तुम्ही उपाशीपोटी असताना काढून घेतील. संशोधक तुम्हाला तुमच्या प्रकृतीसंबंधी, डॉक्टरांनी सवयी आणि खाण्यापूर्ण सवयी प्रश्न विचारतील.

तुमच्या रक्तातील पांढर्या पेशीमधून आर.एन.ए. हा वेगळा करून ल्यापणसून जीन एक्स्प्रेशनचा अभ्यास केला जाईल. या संशोधनामुळे तुमच्या डॉक्टरांनी ठरविलेल्या उपचार पद्धतीमध्ये कोणत्याही प्रकारची अडथळा होणार नाही.
होणारा ब्रास आणि धोके:
रक्त काढून घेताना थोडया वेदना होतील. काही वेढूत सुड टोल्सेल्या ठिकाणी लाली किंवा सुज येऊ शकते. ही तक्कार कोणत्याही औषधोपचारासाठी थोडया दिवसात नाहीशी होते.

होऊ शकणारे दुष्परराम:
ह्या अभ्यासात वापरल्या जाणाने पद्धतीमुळे कोणत्याही प्रकारचे दुष्परराम होणार नाहीत.

रुग्णास व इतरांना होणारे फायदे:
ह्या अभ्यासात सहभागी झालेल्या मधुमेहाच्या रुग्णांनाच नक्क सह इतर रुग्णांना देखील या अभ्यासातून मिळणार्या माहितीचा फायदा होऊ शकेल.
जर ह्या अभ्यासाचे काही ब्रास आणि दुष्परराम असत्यास ते रुग्णास पूर्णपणे लेखी आणि तौडी समजावून सांगितले जातील. जर रुग्णाने या अभ्यासात येण्यास नकार दिला तर त्याच्या उपचार पद्धतीमध्ये काहीही बदल होणार नाही. जर रुग्णाने ह्या अभ्यासात येण्याचे ठरविले आणि नंतर जर त्याच्या असत्यास बाहेर पडायचे असत्यास त्याच्याकडून काहीही दुंड घेण्यास येणार नाही आणि तुमच्या संशोधनातील सहभागाबद्दल गुप्तता राखली जाईल. ह्या संशोधनाची माहिती प्रकाशित झाल्यास अथवा सादर केल्यास तुमच्या नावाचा उलेख केला जाणार नाही.
रुग्णास जर काही त्याच्या अभ्यासातील सहभागाबद्दल प्रश्न असतील किंवा त्यासांवरील अधिक माहिती हवी असेल डॉ. अनिकेत कुवळेकर (सायांटीस्ट, इष्टा, भारती विद्यापीठ, पुणे; फोन. नं. ९८२२३९९४४६) अथवा डॉ. मधु लागवंशी (डॉक्टर व प्रपाठक, मेडिसीन विभाग, भारती विद्यापीठ होस्पिटल; फोन नं.: ९८२२९८८३३) ह्यांना
फोनद्वारे संपर्क साधू शकतात अथवा त्यांच्याशी विश्वासाने प्रत्यक्ष चर्चा करण्याची संधी मिळू शकते.

सहभागी होण्याचे अनुमती पत्र

वरील माहिती म्हणून तिच्या मला वाचून दाखवण्यात आली आहे, आणि या म्हणून सहभागी होण्यास तयार आहे.

(    ) वरील माहिती रुग्णाने वाचली आहे.

(    ) वरील माहिती रुग्णासाठी वाचली आहे.

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सहभागी होण्याची स्वाक्षरी—

सहभागी होण्याचे नाव—

संशोधकाचे नाव—

दिनांक—
PROFORMA

NAME-  REG. NO.-

OPD-

IPD-

AGE-  SEX-

OCCUPATION-

ADDRESS-

INCOME-

CHIEF COMPLAINTS-

DURATION-

HISTORY OF PRESENT ILLNESS-
PAST HISTORY-
DM- HTN- TB- CAD-

OTHERS-

PERSONAL HISTORY-
SLEEP HRS- DIET-
APPETITE- ADDICTION-

LIFESTYLE-
SEDENTARY / LABOURER / HOUSE WORK
URBAN / RURAL-
BOWEL / BLADDER-

FAMILY HISTORY- 1\textsuperscript{0}-
2\textsuperscript{0}-
DM- HT- TB- CAD-

SUDDEN DEATH-
TREATMENT HISTORY -

OHA / INSULIN / ANTI OBESITY DRUGS / ANTI LIPID DRUGS

OBSTETRIC HISTORY (FEMALES) – PCOD / INFERTILITY / THYROID

MENSTRUAL HISTORY

GENERAL PHYSICAL EXAMINATION -

ANTHROPOMETRY -

HEIGHT - in meters

WEIGHT - in kgs

BMI - kg/m²

WAIST TO HIP RATIO -

MAC - CH -

W - H -

SKIN FOLDS THICKNESS (BODY FAT CALIPERS) -

BODY FAT CALCULATION -
TEMP-

PULSE- /MIN

BP- MM/HG RR- /MIN

PALLOR-

CYANOSIS-

CLUBBING-

EDEMA-

ICTERUS-

LMPHADENOPATHY-

SKIN / HAIR / NAILS
SYSTEMIC EXAMINATION

CVS- S 1 S 2

Murmur-

RS-

Shape of chest-
Adventitious sounds- crepts / ronchi / pleural ub.
Breathing- Bronchial / Vesicular

CNS-

Higher functions-
Tone- Power-
Reflexes- Sensory system-

PA-

Tender / nontender-
Liver / Spleen / Kidney
Free fluid- yes / no
INVESTIGATIONS—

I. HEMATOLOGICAL INVESTIGATIONS—

HB- gm%
TLC-
DLC- NLEMB
PBS-
PLATELET COUNT-
ESR- mm

II. BIOCHEMISTRY—

BSL PROFILE-

FASTING- PP-

LIPID PROFILE-

TOTAL CHOLESTEROL-
S. TRIGLYCERIDES-
S.HDL CHOLESTEROL-
S.LDL CHOLESTEROL-
VLDL-
RFT-

B UREA-

S. CREATININE-

LFT-

S. PROTINSS (TOTAL)-

S. PROTINSS (ALBUMIN)-

S. BILIRUBIN (TOTAL)-

S. BILIRUBIN (DIRECT)-

S. BILIRUBIN (INDIRECT)-

S.G.O.T-                   S.G.P.T-

SERUM ALK. PHOSPHATASE-

TEST FOR DIABETIC NEUROPATHY- 10gm Monofilament test

TEST FOR DIABETIC NEPHROPATHY- 24 HRS URINE MICROALBUMIN TEST
ECG-

CXR-

USG (ABDOMEN)-

IF REQUIRED

2D ECHO-

CARDIAC ENZYMES-

CORONARY ANGIOGRAPHY-

BRAIN IMAGING

CT / MRI / MRA / NONE
IRSHA

FOOD FREQUENCY QUESTIONNAIRE

Name of the Subject:

Family size:  Adults:  Children:

Diet type:  1. Vegetarian  2. Mixed

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<th>No</th>
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<th>Per day</th>
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**O BAKERY PRODUCTS**

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**P FERMENTED FOODS**

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**Q SNACKS**

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**R FESTIVAL FOOD**

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Oil consumption per month: ___ liters