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"The effect of whole barley and cinnamon on blood glucose level & lipid profile with type 2 diabetes"

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Abstract

The study aimed at the effect of the intake of barley and cinnamon on the level of diabetes in type 2 patients and blood lipids and divided the number of 64 patients with no complications of diabetes and non-dieting diet or any sports activity, on 4 groups, including a group of women and others dealing with barley and a group dealing with first And the last one deals with barley and cinnamon together.

A nutritional history was done by taking an average of 24-hour retrieval in the first trial, 6 weeks later and 12 weeks later.

Some laboratory tests, such as total blood lipids and blood glucose levels, were measured from the first trial, 6 weeks later and 12 weeks later.

The results showed an improvement in blood sugar level as well as fat respectively on the Barley group and the last Cinnamon group which showed the most results from the descent of sugar and blood lipids.

All of this is illustrated by the results through tables and graphs.

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LIST OF ABBREVIATIONS

3-OHB	3-hydroxybutyrate
Ab+	Antibody positive
ABCD	Association of British Clinical Diabetologists
ACCORD	Action to Control Cardiovascular Risk in Diabetes
ACE	angiotensin-converting enzyme
ADA	American Diabetes Association
ADDITION	Anglo-Danish-Dutch Study in General Practice of Intensive Treatment and Complication Prevention in Type 2 Diabetic Patients Identified by Screening
ADVANCE	Action in Diabetes and Vascular disease: preterAx and diamicroN mr Controlled Evaluation
AER	Albumin excretion rate
AGE	advanced glycation end-product
AGREE	Appraisal of Guidelines for Research and Evaluation
ARIC	Atherosclerosis Risk in Communities Study
AUC	area under curve
AUROC	area under receiver operating characteristic
AusDiab	Australian Diabetes, Obesity and Lifestyle
BDR	Background diabetic retinopathy
BFST	Behavioural family systems therapy
BMI	Body mass index
BMI-SDS	Body mass index – standard deviation score
BP	blood pressure
BSPED	British Society for Paediatric Endocrinology and Diabetes
CASCADE	Child and Adult Structured Competencies Approach to Diabetes Education
CBT	Cognitive behavioural therapy
CGMS	Continuous glucose monitoring system
CHD	coronary health disease
CHF	Chronic heart failure
CI	confidence interval
CKD	chronic kidney disease
CNS	central nervous system
CRP	C-reactive protein
CRS	Cambridge Risk Score
CVD	cardiovascular disease
DALY	disability-adjusted life-year
DARTS	Diabetes Audit and Research in Tayside Scotland
DBP	diastolic blood pressure
DCCT	Diabetes Control and Complications Trial
DCM	Diabetic cardiomyopathy
DECODE	Diabetes Epidemiology: Collaborative Analysis of Diagnostic Criteria in Europe
DED	Dietary energy density
DM	diabetes mellitus
DPP	Diabetes Prevention Program
DPS	Diabetes Prevention Study
DRI	dietary reference intake
EASD	European Association for the Study of Diabetes
ELSA	English Longitudinal Study of Ageing

EPIC	English Longitudinal Study of Ageing
ESRD	end stage renal disease
FBG	Fasting blood glucose
FINDRISC	The Finnish Diabetes Risk Score
FPG	Fasting Plasma Glucose
GADPH	glyceraldehyde's 3-phosphate dehydrogenize
GBF	germinated barley food stuff
GCT	glucose challenge test
GDM	Gestational diabetes mellitus
GI	GLYCEMIC INDEX
GL	GLYCEMIC LOAD
GLUT4	Type 4 Glucose Transporters
GP	general practitioner
GTT	glucose tolerance test
HbA1c	Glycated haemoglobin
HDL	high density lipoprotein
HOMA	homeostasis model analysis
HOMA-IR	homeostasis model assessment for insulin resistance
HR	hazard ratio
HTA	Health Technology Assessment
ICD	International Classifications of Diseases
ICER	incremental cost-effectiveness ratio
IDF	International Diabetes Federation
IFG	impaired fasting glucose
IGR	impaired glucose regulation
IGT	impaired glucose tolerance
IHD	ischaemic heart disease
IQR	interquartile range
IR	Insulin resistance
IRAS	Insulin Resistance Atherosclerosis Study
LDL	low density lipoprotein
LEAD	lower extremity arterial disease
LEADER	Leicester Ethnic Atherosclerosis and Diabetes Risk
MeSH	medical subject heading
MI	myocardial infarction
MRC	Medical Research Council
NAO	National Audit Office
NDH	non-diabetic hyperglycaemia
NGT	normal glucose tolerance
NHANES	National Health and Nutrition Examination Survey
NHS EED	NHS Economic Evaluation Database
NICE	National Institute for Health and Care Excellence
NNS	number needed to screen
NSC	National Screening Committee
OGTT	Oral Glucose Tolerance Test
OR	odds ratio
PCT	primary care trust
PG	plasma glucose
PTP1B	protein-tyrosine phosphatase 1B
PVD	peripheral vascular disease
QA	quality assurance

QALY	quality-adjusted life-year
RBC	red blood cell
RBG	random blood glucose
RCT	randomised controlled trial
RDA	Reference dietary allowance
ROC	receiver operating characteristic
ROS	reactive oxygen species
RR	relative risk
SAGE	skin advanced glycation end-product
SBP	systolic blood pressure
ScHARR	School of Health and Related Research
SD	standard deviation
SHI	statutory health insurance
SIGT	Screening for Impaired Glucose Tolerance
SPHN	Scottish Public Health Network
SPSS	Statistical Package for the Social Sciences
STAR	Screening Those At Risk
T1DM	type 1 diabetes mellitus
T2DM	type 2 diabetes mellitus
TAC	Tacrolimus
TC	total cholesterol
TG	triglyceride
TNF-a	Tumor Necrosis Factor Alpha
UKPDS	UK Prospective Diabetes Study
VADT	Veterans Affairs Diabetes Trial
WHO	World Health Organization
YHPHO	York and Humber Public Health Observatory

1. Introduction

Nutrition plays a pivotal role in life and in medicine all over the world. In particular, acute and chronic diseases such as diabetes mellitus in most organ systems have pronounced effects on food intake and metabolism with increased catabolism, which lead to nutrition-related conditions like obesity that associated with increased morbidity and eventually death. At the other end of the spectrum, diet is a major determinant of future health, promoting the absence or postponement of disorders like diabetes and related complications **(GBD, 2015).**

Type 2 diabetes mellitus (DM) is an endocrinological chronic metabolic disorder in which prevalence has been rising steadily worldwide (**Deepthi *et al.*, 2017)**. Diabetes mellitus resulting from an irregularity in insulin secretions and insulin actions or both. Absence or reduced insulin in turn leads to persistent abnormally high blood sugar and glucose intolerance **(Jahan *et al.*, 2015)** .It is estimated that, in the year 2017, 451 million (age 18–99 years) people had diabetes worldwide, and this is potentially it will affect more than 693 million by 2045. Also, it was estimated that almost half of all people (49.7%) living with diabetes are undiagnosed. Moreover, there was an estimated 374 million people with impaired glucose tolerance **(Cho *et al.* 2018)**. Diabetes is not a single disorder, it is a multisystemic disease that is primarily associated with the pancreas, but also affects the skeletal muscles, gastrointestinal tract, kidneys, and brain **(Cornell 2015).**

Type 2 diabetes mellitus is the most widely recognized endocrine issue in humans. Currently it is estimated more than 387 million people had type 2 diabetes worldwide, and this expected to increase to 592 million by 2035 **(Gutiérrez-Rodelo *et al.*, 2017).** Recently, type 2 diabetes is rising rapidly in developing and developed countries; however, it is demonstrated to be ever-rising in the Arab world nations **(Meo *et al.*, 2017).** The global prevalence of type 2 diabetes mellitus is more progressively and recorded as a threatening and most exigent attitude to the healthcare providers. In addition Type 2 diabetes accounts for at least 90% of all cases of diabetes **(IDF, 2015).** Thus, it must take in consider that even with the great developments in medical sciences and diabetes science, it is still an incurable life-long disease, which is swiftly growing among different age groups of men and women. It engages various physiological functions, organs and multiple systems resulting in extensive ranging and highly damaging complications **(James *et al.*, 2002),** which associated with relatively specific long term microvascular complications affecting the eyes, kidneys and nerves, as well as an increased risk for cardiovascular disease **(Punthakee *et al.*, 2018).**

Otherwise, managing and treating diabetes have become more costly due to high financial burden on the patients and the total healthcare system. Moreover, available treatment options in modern medicine have several adverse effects. Therefore, there is a need to develop safe and effective treatment modalities for diabetes. Many herbs and spices which we use them for the daily needs are claimed to have properties of lowering the blood sugar levels, because of these properties they are