



TYPE-II DIABETES MELLITUS; THERAPEUTICS EFFECTS OF OLIVE OIL AND GARLIC ON GLYCEMIC CONTROL IN THE PATIENTS OF TYPE-II DIABETES MELLITUS.

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ABSTRACT... Background: Diabetes Mellitus is the global health problem all over the world. The millions of people facing morbidity and mortality due to poor glycemic control with their complications. Now a days many researchers working on the benefits of natural remedies to control and cure different diseases like diabetes, hypertension, dyslipidemia etc. **Aims & Objectives:** To evaluate the therapeutic efficacy of (combination of olive oil & garlic) on glycemic control with comparison conventional allopathic therapy. **Study Design:** Prospective Randomized control Trial (RCT). **Setting:** Institute of Biochemistry Sindh University Jamshoro. **Period:** Three months from 15th July to 15th October 2017. **Methodology:** Collaboration of diabetic clinic medical wards LUMHS Jamshoro. Total 160 patients recruited and divided into two groups control and case study group. Anti-diabetic drugs were given both group with same dose and balanced diet, formulated capsules containing 1.1 ml of olive oil & 500mgs of garlic powder were given only patients of case study group for 12 weeks. Fasting blood sugar levels were analyzed by glucose oxidase method at zero level, level – I, level – II, while HbA1c% was detected by micro lab at zero level & level – II. **Results:** The results of our study; shows that serum fasting level significantly (p value = <0.001) reduce in case study group as compared to control group, glycemic control significant (p= <0.001) better observed in case study group as compare with control group. **Conclusion:** Our study concluded that components of olive oil and garlic have hypoglycemic effects with good glycemic control. With proper usage of garlic and olive oil in diet of diabetic patients can maintain glycemic control with in normal limits.

Key words: Diabetes Mellitus, Garlic, Olive oil, Glycemic Control (HbA1c).

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INTRODUCTION

Diabetes Mellitus is an endocrine disease characterized by means of hyperglycemia due to partial or complete incapacity of the frame to supply insulin.¹ 347 millions people reported in all over the world suffering from this disease.² The Pakistan on the 10th position in all over the world for mortality ratio due to diabetes mellitus.³ The elevated blood sugar level can produce long time complications like coronary, renal, vascular & ophthalmological problems.⁴ The progress of these complications may be prevented in humans with good glycemic control by using imposing way of life modifications or the usage of remedial allopathic and natural substances.⁵ The presently available oral allopathic drugs are sulfonylureas, α -glucosidase inhibitors, bigunides, meglitinides, thiazolidinediones and Dipeptidyl peptidase-4

inhibitors.⁶ Oral anti diabetic drugs both boost up the pancreatic secretion of insulin (secretogoge) or elevated the receptor sensitization for the insulin (sensitizers). Gliclazide belong to sulfonylureas group of anti diabetic tablets which might be secretogoges in their nature in particular however some sensitizing residences also are documented. about 25% - 30% Diabetic type-2 sufferers do not given proper result to evaluation among S-Allyl Cysteine and Gliclazide in reducing the blood glucose levels in diabetic patients oral drugs (not response primarily) at the same time as 5% diabetic patients from diabetic population give response initially turn out to be nonresponsive to those substances (Secondary screw ups).⁶ Aside from this the available drugs have many side effects on human metabolism. Continuous efforts are being made by way of the

scientists to discover new agents for the answer of this worldwide. The Plant life had been used as remedy and source of medication in historical instances. S-allylcysteine is an amino acid derived from Garlic that is used considering that more than hundreds of years as anticancer.⁷ Garlic turned into previously studied and determined beneficial in lots of diseases strategies.⁷

On the other end olive oil contain rich source of monounsaturated fatty acids and contain good amount of phenolic compounds which reflects positive effects on lipid profile and glycemic control.⁸ Phenolic compounds effect on glycemic control because they decrease postprandial glycemic response, fasting blood sugar level and increase the secretion of insulin & receptors sensitivity of insulin.⁹

OBJECTIVE

To evaluate the therapeutic efficacy of oral administration of (combination of olive oil & garlic) on glycemic control with comparison conventional allopathic therapy.

METHODOLOGY

Study Design, Place, Duration

This prospective Randomized control Trial (RCT) study has been carried out at the Institute of Biochemistry Sindh University Jamshoro with collaboration of diabetic health center at medical wards LUMHS Jamshoro for three months from 15th July to 15th October 2017.

Sampling Technique

All subjects were selected on the basis of non probability type of sample technique.

Grouping & Selection of Subjects

Diagnosed cases of type – II diabetes mellitus were selected for this study. Total 160 patients were selected and divided into two groups equally. Control Group (Group A) & Case study Group (Group B) each group contain 80 diabetic subjects.

Treatment Schedule

Allopathic drug Glimepiride 2mg with combination

of Metformin Hcl 500mgs (Tb. Getformain 2/500) 1 tablet before breakfast daily to patients of control group, and same allopathic drug (tb, Getformin 2/500mg) along with formulated capsules contain 1.1 mg of olive oil & 500mgs of garlic powder two times a day were given to patients of case study group with permission of ethical committee & board of University of Sindh Jamshoro.

Inclusion & Exclusion Criteria

The diagnosed cases of type -2 Diabetes mellitus, with the age range from 40 – 60 years, both male females were included in this study.

The patients of Insulin dependent diabetes, renal failure, bypass cardiac surgery, hepatic disorder, refusal of subjects, below age 40 or above age 60 of patients were excluded from this study.

Blood Sampling & Analysis

The 3ml of 10 hours fasting blood sample were collected from all the subjects under aseptic measurements, before the start of treatment as level zero, after 1 month of treatment as level – I and after the 3 months of therapy as level – II. Fasting Blood sugar level was detected by glucose oxidase kit method, HbA1c% level was detected on Micro lab instrument. HbA1c% Sample analyzed at level zero & at level II.

Statistical Analysis

All data was analyzed on SPSS version 16, “Student Paired t Test” applied for detection of significance of the study.

RESULTS

Total 160 diabetic subjects divided into 2 groups each group contain 80 subjects. Fasting Blood Sugar (FBS) level measured at level – 0, I & II.

In Group A the mean FBS level at level - 0 was 181 ± 4.09 mg /dl, at level-I; $152 \pm 3,46$ mg/dl, and at level -II, 114 ± 3.45 mg/dl and in group B mean serum FBS level at level – 0 was 181 ± 4.1 mg/dl, at level -I, 140 ± 3.1 mg/dl and at level – II 91 ± 4.2 mg/dl, after completion of three months therapy there was significant reduction in FBS of group B patients($p = <0.001$) even there mean FBS become in normal range.

In the group A HbA1c% at level 0 was $10.83 \pm 0.39\%$, at level-II was $8.38 \pm 0.33\%$ while in group B, HbA1c% at level 0 was $10.88 \pm 0.4\%$, at level-II it was $7.1 \pm 0.7\%$, it shows there was significant ($p = <0.001$) glycemic control of group B as compared to group A.

Parameter	Group A (Control Group)	Group B (Case Study Group)
No: of subjects	80 (60 males & 20 females)	80 (58 males & 22 females)
Age	40 – 60 years	40 – 60 years
BMI (mean)	26.9 kg/m ²	26.9 kg/m ²
FBS (mean)	181 mg/dl	181 mg/dl
HbA1c % (mean)	10.8 %	10.8 %

Table-I. Generalized parameter of both groups before start of research study

Level	Group A	Group B
Level – 0	181 ± 4.09	181 ± 4.1
Level – I	$152 \pm 3,46$	140 ± 3.1
Level – II	114 ± 3.45	$91 \pm 4.2^{**}$

Table-II. Serum FBS (mg/dl) at different level of research study (shows p value = <0.001)**

Level	Group A	Group B
Level – 0	10.83 ± 0.39	10.88 ± 0.4
Level – II	8.38 ± 0.33	$7.1 \pm 0.7, **$

Table-III. Blood HbA1c (%) at different level of research study (p value = <0.001)**

DISCUSSION

Life style modification like reduction in body weight by regular physical exercise has positive effect on the controlling morbidity & mortality of diabetes mellitus. Allopathic medicine from long time used for the treatment of diabetes and control proper glycemic control.^{5,6} Many rural areas where patients not afford these allopathic drugs they do not take properly so there is need to elaborate the health benefits of natural products like olive oil, garlic etc.

Our study shown there is strongly significant ($p = <0.001$) impact of olive oil and garlic on glycemic control and fasting blood sugar.

The allin and allinase enzyme are the main compounds of garlic. Allinase enzyme may be activated all through the chopping or crushing system, and then it will convert alliin to alliin.¹⁰

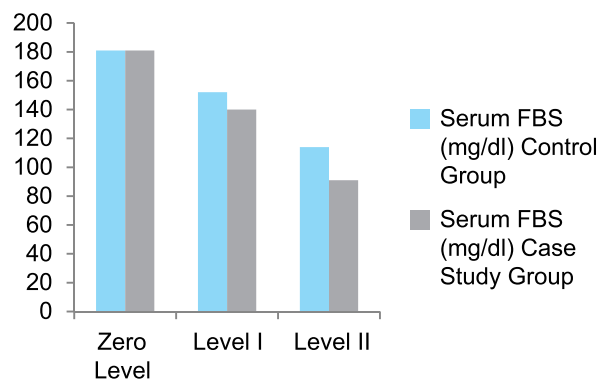


Figure-1. Serum FBS level (mg/dl)

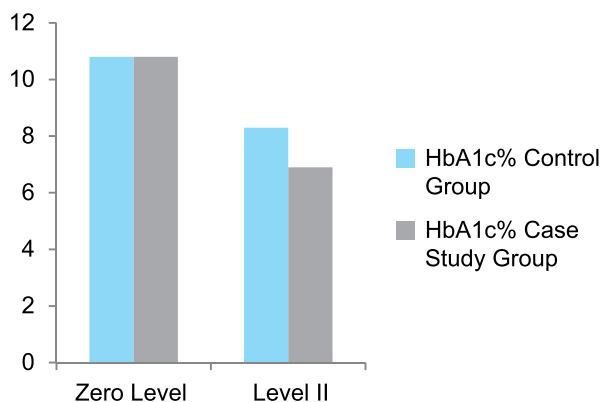


Figure-2. HbA1c%

Garlic powder contains best alliin, allinase enzyme, and alliin, while raw garlic contain antioxidant component also like allixin, Diallyl sulphide these compounds responsible for increase secretion of insulin and increased insulin sensitivity.¹⁰

Phenolic compounds are strong antioxidants which might be ubiquitous in flowers besides their antioxidant energy, these molecules seem to have pleiotropic consequences, and there's mounting proof that they have an effect on human body structure in lots of methods, which includes in decreased adiposity and blood strain, improved lipid profiles, consequences, similarly to defensive from CVD developing proof additionally shows that polyphenol-wealthy meals and drinks reduce postprandial glycemic responses and fasting hyperglycemia and enhance insulin secretion and insulin sensitivity.^{8,9} Our study also correlates with; Jaun Wang et al (2017),¹¹ concluded in their Meta

analysis that components of garlic have positive effect on good glycemic control in management of type – II diabetes, lipid profile.

Ansari MA et al (2017);¹² studied on diabetic rats models and concluded that garlic significantly having hypoglycemic effects on diabetic rats model.

M. Mahmoodi et al (2011),¹³ studied effects of black and raw garlic on fasting blood sugar level in dyslipidemic patients in iran and concluded that garlic is reducing agent for blood sugar level. Marta Guasch-Ferré et al (2015)¹⁴ research on obese diabetic women and concluded that long usage of olive oil in diet can control type 2 diabetes in obese females.

Most of the animal and human studies reflect the health beneficial role of garlic & olive oil in the management of type 2 diabetes mellitus by good glycemic control with increase secretion of insulin and its sensitivity.

LIMITATIONS & FUTURE RECOMMENDATION

Serum insulin level not done in this study so in future will study effects of natural herbs on serum insulin level also. Another limitation is that minimum & maximum effective hypoglycemic dose we not know properly of garlic and olive oil, so need work on that parameter also.

CONCLUSION

Our study concluded that components of olive oil and garlic have hypoglycemic effects with good glycemic control. With proper usage of garlic and olive oil in diet of diabetic patients can maintain glycemic control with in normal limits.

Conflict of Interest

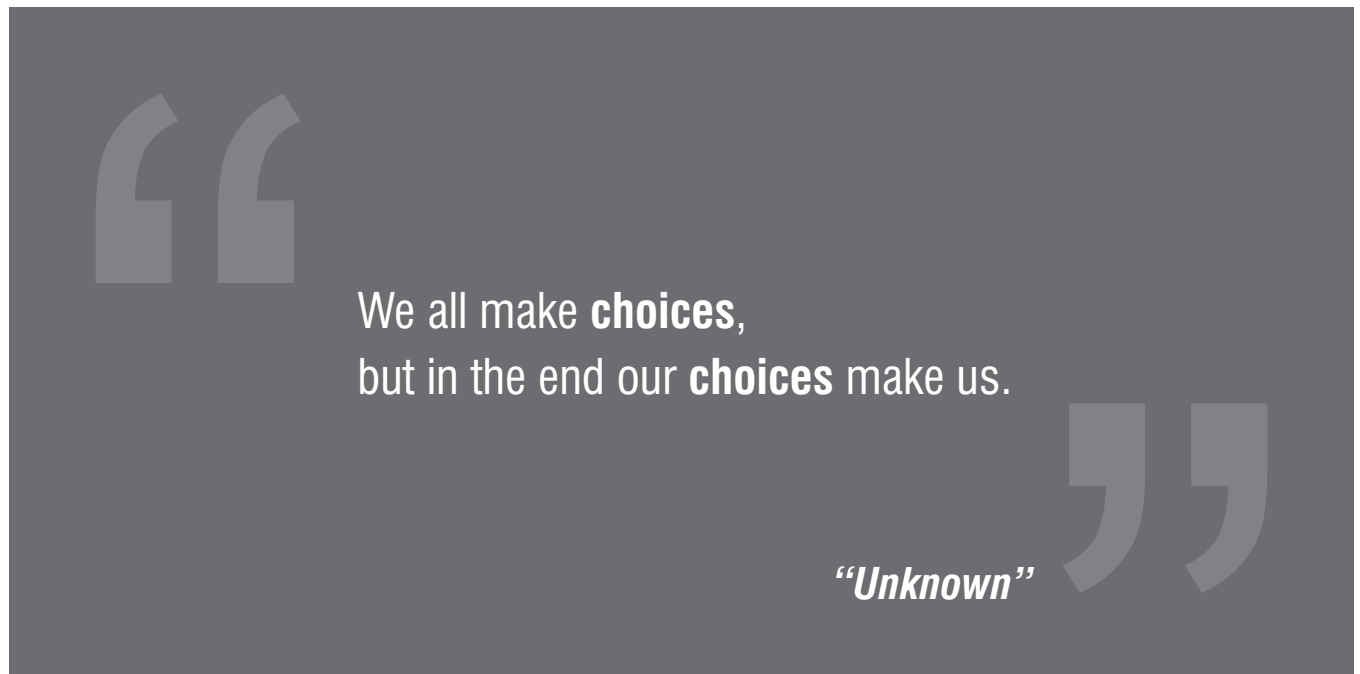
There is no any conflict of interest.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author-s Full Name	Contribution to the paper	Author=s Signature
1	Ali Raza Memon	Hypothesis Designing, Focal to conduct research, Data Collection Compilation & Finalzation.	
2	Allah Bux Ghanghro	Manuscript review & Finalization.	
3	Nasreen Qazi	Statistical Analysis & Table Preparation.	
4	Muhammad Akram	Biochemical Analysis & Article Arrangement.	
5	Imran Ali Shaikh	Manuscript review & Finalization.	