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Effect of using Boswellia serrata powder on the patient's lipid profile with diabetes mellitus type II

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Abstract
Background: Diabetes Mellitus (DM) is one of the most frequent medical disorders in the world today. Various oral hypoglycemic medications can be used to treat it. Natural remedies are becoming increasingly popular as a source of treatment around the global. In comparison to pharmaceutical pharmaceuticals, antidiabetic herbal therapies have a lot of benefits. Boswellia Serrata is a potential traditional medicinal plant with a number of qualities that make it a significant subject in pharmaceutical research and low-density lipoprotein (LDL) and high-density lipoprotein (HDL) in diabetic patients.
Methods: The control group consisted of 60 patients with type 2 diabetes of both sexes, whereas the study groups consisted of 60 patients with type 2 diabetes of both sexes (20 participants per group). Boswellia serrata powder (1200 mg) was administered orally (three doses of 400 mg) in the study group, divided into metformin with Boswellia serrata and metformin without Boswellia serrata, with a control group receiving metformin without Boswellia serrata. Blood samples for (HDL, LDL, Cholesterol, and TG) were taken at the start of the study and there was no significant difference, thus it was evaluated after 12 weeks in individuals with type 2 diabetes.
Results: When compared to the control group, the administration of Boswellia serrata in diabetic patients resulted in a high significant drop ($P < 0.01$) in the level of in (LDL, Cholesterol, and TG) and a highly significant rise ($P < 0.01$) in the level of HDL.
Conclusion: This study discovered that consuming Boswellia serrata supplements can assist people with type 2 diabetes maintain a stable and balanced lipid profile. Consequently, based on the findings, its usage may be advantageous in both metformin and non-metformin individuals.

Keywords: Boswellia serrata, lipid profile level, diabetes mellitus type II

Introduction

Diabetes Mellitus (DM) is one of the most frequent medical disorders in the world today. Pancreatic cells produce insufficient or no insulin, and target cells do not respond to circulating insulin, resulting in hyperglycemia [1]. Various oral hypoglycemic medications can be used to treat Type 2 Diabetes Mellitus. Synthetic anti-diabetic medications now on the market have been linked to several adverse severe effects and problems [2]. When first-line oral hypoglycemic medications fail to fulfil treatment goals, patients are frequently recommended dual drug treatments. Traditional dose formulations, despite their medical benefits, have limited bioavailability and a short half-life, necessitating repeated administration and causing additional adverse effects, As a result, the therapy is unsuccessful, and the patient does not comply [3]. In many parts of the globe, the growing cost of treating metabolic illnesses may have a considerable economic impact, limiting patients' access to effective treatments [4, 5]. Boswellia Serrata is a possible traditional medicinal plant component that possesses anti-inflammatory properties, making it an interesting target for pharmaceutical research, antibacterial, antifungal, and antitumor properties [6] Nurses play an important role in the treatment and education of diabetes patients. With the increased prevalence of diabetes (particularly type II) in every country, their role has become more crucial in recent years. Self-management therapy includes a focus on health. Patients are usually taught rudimentary food preparation, carbohydrate measuring, and exchanges in order to become self-sufficient [7].
Complementary and Alternative Therapy (CAM) is most accessible to nurses. Nurses may assist patients and families with information on complementary and alternative therapies and provide support for their decisions. This emphasizes the need of including complementary and alternative therapies in nursing education [8]. Transcultural Nursing Theory, developed by Madeleine Leininger, supports the study issue by discussing the importance of nursing and the culture of interacting with patients in all aspects that contribute to the provision of nursing care. One of these cultures is that of providing alternative therapy that does not result in problems but rather leads to the patient's recovery without side effects. She stated her commitment to discovering the epistemological sources of nursing information on cultural care and its underlying definitions and features [9]. As

a result, the goal of this study is to determine the efficacy of these traditional materials in treating the condition of patients with type 2 diabetes. Since a result, nurses must take action in delivering nursing health care to type II diabetic patients by educating them about the use of safe nutritional supplements in the treatment of diabetes, as they are both safe and effective in lowering blood sugar and cholesterol levels.

Materials and methods

After receiving clearance from the Najaf Health Department, the current study was conducted at the Endocrinology and Diabetes Clinic at Al Manathira Hospital in Najaf Governorate. The Ministry of Planning / Central Statistical Council must also grant official approval to accept the study instrument, conduct the study, and implement the intervention. The Medical Ethical Committee of the University of Kufa has approved the study.

The Study Design

This study is a quasi-experimental design was carried out to determine the effect of Boswellia serrata on the lipid profile in type II diabetes patients.

Sample of the Study

A non-probability purposive sampling of (participant 60) patients with type II diabetes, the patients chosen was divided into three groups, each with an equal number of patients. (20 diabetic patients per group). All participants were considered for inclusion and exclusion criteria, which were categorized as follows:

1. **Study group I:** The first group includes patients with type II diabetics who were treated with the Boswellia serrata plant with their treatment (Metformin).
2. **Study group II:** The second group includes patients with type II diabetics treated with Boswellia serrata without any other treatment and dependent on their lifestyle.
3. **Control group:** The third group is the control group, patients who are not receiving the Boswellia serrata and still receiving the classic intervention (metformin).

Statistical Analysis

The statistical package for social sciences (SPSS) version 25 was used to enter and analyse the data from the research sample. The analysis included the two types of statistics Descriptive statistics (mean, frequencies, and percentages. Using bar charts and a normal distribution curve, all continuous data were checked for statistical normal distribution.). Inferential Statistics A Chi-square test was used to compare frequencies. Bivariate Pearson's correlation test.

Result

Table 1: Statistical distribution of patients by their Socio-Demographic Data for the study groups

Items	Sub-groups	Group I		Group II		Control		Chi Square P value
		F.	%	F.	%	F.	%	
Age	31-39	1	5.0	1	5.0	4	20.0	5.55
	40-48	9	45.0	6	30.0	9	45.0	0.23
	49-57	10	50.0	13	65.0	7	35.0	NS
Gender	Male	10	50.0	13	65.0	14	70.0	1.83
	Female	10	50.0	7	35.0	6	30.0	0.39 NS
Residence	Urban	11	55.0	9	45.0	7	35.0	1.62
	Rural	9	45.0	11	55.0	13	65.0	0.44 NS
Daily Sport	Yes	0	0.0	1	5.0	0	0.0	2.03
	No	20	100.0	19	95.0	20	100.0	0.36 NS
Patient eat 3 meals	Yes	12	60.0	15	75.0	11	55.0	4.31
	No	8	40.0	5	25.0	9	45.0	0.65 NS
BMI	Normal	1	5.0	2	10.0	3	15.0	2.69
	Overweight	12	60.0	13	65.0	9	45.0	0.61
	Obese	7	35.0	5	25.0	8	40.0	NS
Total		20	100%	20	100%	20	100%	

NS: Non-significant at P value >0.05; HS: High Significant at P value <0.01: BMI: Body Mass Index

Table (1) shows the statistical distribution of participants by their socio-demographic data for the three study groups.

In group, I (the sample group that uses Boswellia serrata in conjunction with metformin), the highest percentage of participants' subgroups (50 %) are for patients aged 49 to 57 years old. Gender males and females have an equal percentage (50 %) evenly distributed, while more than half (55%) live in urban areas. All of the samples in group I (100%) do not participate in regular sports activities, are overweight (60%) and eat three meals each day (60%). In group II (the sample group that uses Boswellia serrata without Metformin), the highest percentage of participants' subgroup are (65 per cent) for patients between the ages of 49 and 57 years old, with male patients outnumbering female patients (65 %); in the upper rural residency sample, male patients outnumber female patients (65 %) (55 %). The majority of them (95 %) do not participate in regular physical activities, just have to consume three meals (75 %), and are overweight (65 %).

In the control group (the sample group that does not take Boswellia serrata), the highest percentage of participants' subgroups are (45%) for patients aged 40 to 48 years old, with the majority of the gender (70%) being male patients; (65%) of them live in rural areas, with all of them (100%) having no daily sports practice while (45%) using three meals, and the same result (45%) for overweight patients.

Table 2: The differences in lipid profile among the three groups in the pretest.

Indicators	Group I (No. = 20)		Group II (No. = 20)		Control (No. = 20)		F test	P value	(Sig.)
	Mean	SD	Mean	SD	Mean	SD			
HDL mg\dl	29.62	9.00	27.16	6.53	27.53	7.71	0.57	0.56	(NS)
LDL mg\dl	137.18	35.97	145.88	30.93	158.29	34.30	1.97	0.14	(NS)
Cholesterol mg\dl	210.65	39.57	212.90	41.63	235.20	35.48	2.84	0.07	(NS)
Triglyceride mg\dl	225.10	60.64	204.65	70.86	231.60	76.17	0.39	0.67	(NS)

SD: Standard Deviation; sig: significances: NS: Non-significant at P value >0.05

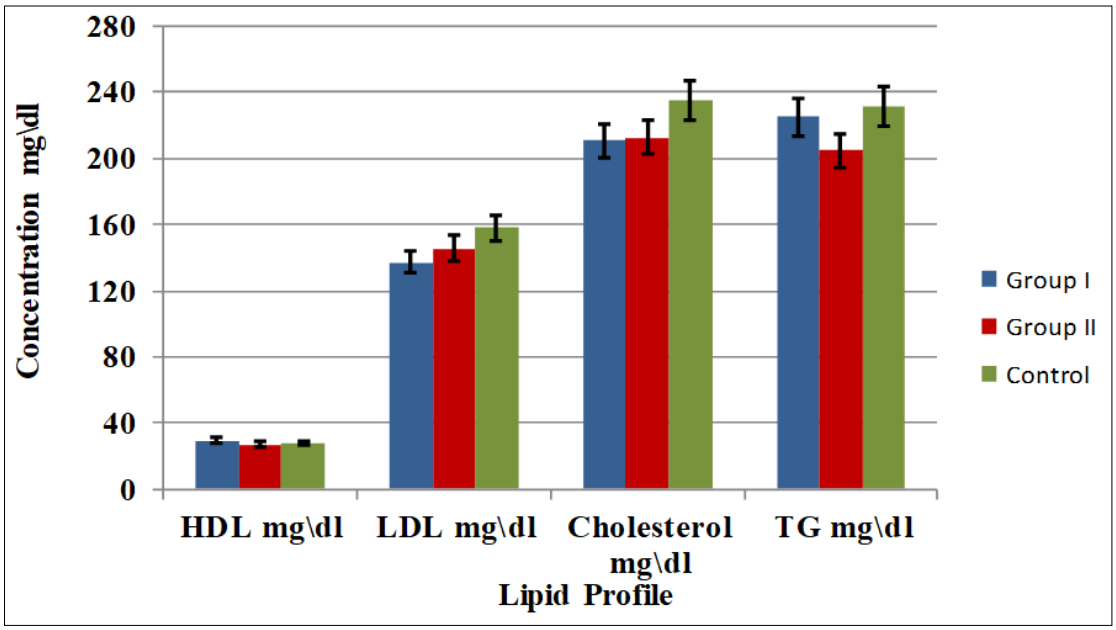

Fig 1: The Differences in lipid profile among groups under study pretest administration

Table (2) and Figure (1) show the differences in lipid profiles between the three groups studied before and after BS administration. According to this table, in terms of lipid profile before BS administration, there is no significant difference (P >0.05) between groups I, II, and control.

Table 3: The differences in lipid profile among groups under study post-test

Indicators	Group I (No. = 20)		Group II (No. = 20)		Control (No. = 20)		F test	P-value	(Sig.)
	Mean	SD	Mean	SD	Mean	SD			
HDL mg\dl	42.79	5.40	42.00	9.10	28.88	6.57	23.65	0.000	HS
LDL mg\dl	106.24	21.39	103.90	28.37	166.32	23.45	41.43	0.000	HS
Cholesterol mg\dl	183.35	26.04	179.75	28.35	240.55	29.96	29.34	0.000	HS
Triglyceride mg\dl	168.68	90.83	150.05	42.92	226.55	69.08	4.87	0.01	HS

SD: Standard Deviation; HS: High Significant at P-value <0.01; Different letters refers to high Significant Difference at $p < 0.01$

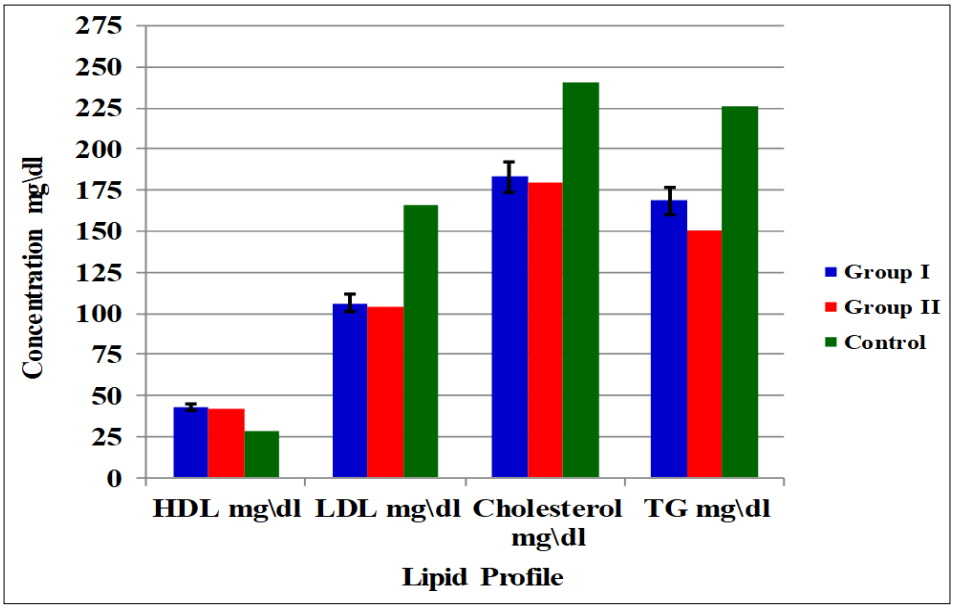

Fig 2: The differences in lipid profile among groups under study posttest administration

Table (3) and Figure (2) show the variations in lipid profiles between the study and control groups following BS administration. This table shows that following administration of BS, there is a highly significant drop (P <0.01) in the levels of (LDL, cholesterol, and TG) and a highly significant rise (P <0.01) in the levels of HDL in both I and II groups compared to the control group.

Table 4: Differences in lipid profile among studied groups after administration of Boswellia serrate

Indicators	Group I (No. = 20)		Group II (No. = 20)		Control (No. = 20)		F test P value (Sig.)
	Mean	SD	Mean	SD	Mean	SD	
HDL mg\dl	42.79 A	5.40	42.00 A	9.10	28.88 B	6.57	23.65 0.000 HS
LDL mg\dl	106.24 A	21.39	103.90 A	28.37	166.32 B	23.45	41.43 0.000 HS
Cholesterol mg\dl	183.35 A	26.04	179.75 A	28.35	240.55 B	29.96	29.34 0.000 HS
Triglyceridemg\dl	168.68 A	90.83	150.05 A	42.92	226.55 B	69.08	4.87 0.01 HS

SD: Standard Deviation; HS: High Significant at P value <0.01; Different letters refers to high Significant Difference at p < 0.01

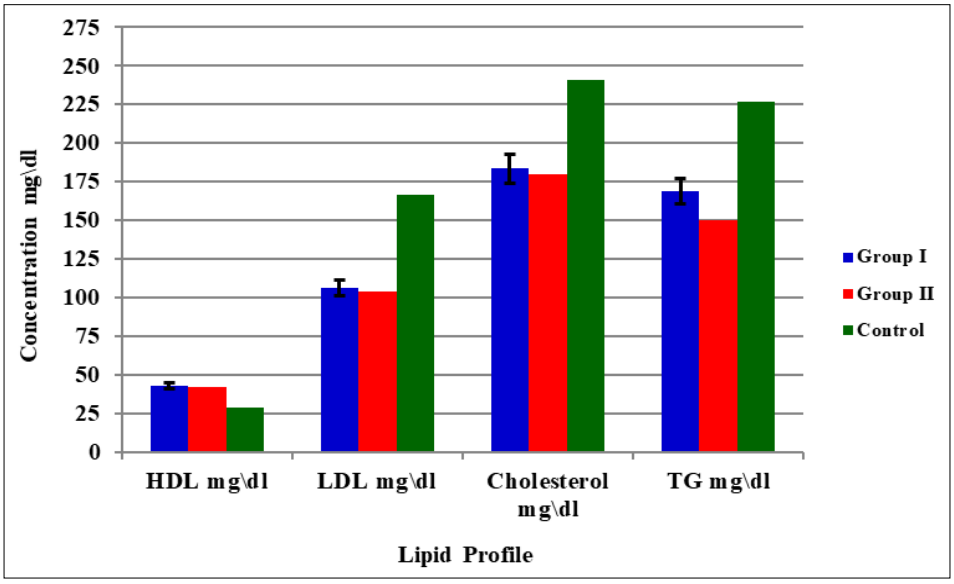

Fig 3: Differences in lipid profile among studied groups after administration of Boswellia serrate

Table (4) and Figure (3) show the lipid profile changes among the groups examined after Boswellia serrate administration. According to this table, following administration of Boswellia serrate, there is a high significant drop (P <0.01) in the level of (LDL, cholesterol, and TG) and a highly significant rise (P <0.01) in the level of HDL in both groups I and II compared to the control group.

Discussion

According to the present findings, the majority of patients are overweight or obese, which is the outcome of a long-term energy deficit between consumption and production. Obesity is one of the major factors in the development of type 2 diabetes, and it can be caused by genetics, lifestyle, or a poor diet.

Obesity is a complicated condition caused by a combination of genetic and behavioral factors. is linked to several pathological dysfunctions that have far-reaching implications for both individuals and cultures. Weight maintenance necessitates dietary and behavioral changes (e.g., elevated physical exercise and reduced calorie intake). Obesity is the most prevalent metabolic condition in the world, and it is also the most common cause of insulin resistance [10].

The current study's findings revealed that after taking Boswellia serrata supplements, the proportion of parameters (LDL, cholesterol, and TG) reduced, with a highly significant rise (P <0.01) in the level of HDL in both the I and II groups. After ingesting Boswellia serrata, the difference between the experimental and control groups was non-significant (P value>0.05 Previous research has revealed a reduction in blood glucose and lipid profile levels and the potential health benefits of Boswellia serrata supplementation in type 2 diabetic patients. For a 12-week period, a maximum dose of 400 mg of Boswellia serrata orally twice day might be advised. Methods that are both safe and effective for lowering the risk factors connected with type 2 diabetes [6].

Furthermore, a significant variation in our study did not identify different levels after 6 weeks, according to another study, despite the considerable increase in serum triglyceride and VLDL levels of type II diabetes patients following supplementation with Boswellia serrata. Non-significant alterations in the components listed can produce type 2 diabetes. Non-significant alterations in the components listed can produce type 2 diabetes [11].

Prior contradicting findings may explain that employing a more significant dose as in my present study and a longer duration of up to three months or more than past studies offers good and favorable outcomes without any adverse effects from Boswellia serrata supplements.

Conclusion

Based on the findings and discussions, the study found that taking a Boswellia serrata supplement reduced the lipid profile. However, large-scale trials of 1200 mg of Boswellia serrata are required.

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