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EFFECTIVENESS AND SAFETY OF GLUCOMANNAN SUPPLEMENTS FOR WEIGHT REDUCTION IN IRAQI OBESE ADULTS

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ABSTRACT

The study aimed to evaluate whether it is safe and effective to use glucomannan supplements for weight reduction in obese Iraqi adults. Material and methods: In a prospective observational study conducted at Alsader Medical City in AlNajaf / Iraq, 50 participants with a BMI over 30 kg/m2 were enrolled. Participants were predominately female. Age, Weight, BMI, waist, and hip circumference were recorded before the start of the study and either 4 or 8 weeks later.in addition to physical examination, fasting blood sugar, lipid profile, liver, and renal function parameters all were taken at baseline and 4,8 weeks later. During the study period, the participants were instructed to take 1 gm of glucomannan 1 hour before each meal. Results: There was no significant difference in mean Weight at baseline, which was 84.36 kg; at week 4, 84.21 kg, and week 8, 84.27 kg (p-value 0.36). The mean waist circumference at the bassline was 98.36 cm, 98.30 cm at week 4, and 98.32 cm at week 8, showing no significant difference p value 0.7. The mean total cholesterol was 198.45 mg/dl at baseline, 193.34 mg/dl at week 4, and 191.4 mg/dl, with a significant difference, p-value 0.0001. There was a significant difference in the mean of LDL cholesterol at eight weeks: the mean at baseline was 127.34mg/dl, 125.27 mg/dl at week 4, and 122.23 mg/dl at week 8, p-value 0.0001. There were no severe side effects. Twenty-three participants had mild gastric discomfort, 12 had bloating, and 17 had diarrhea for a few days throughout the study period. Conclusion: Glucomannan supplements administered over eight weeks were safe and effective in reducing serum cholesterol and LDL levels but did not significantly change weight, waist circumference, triglyceride, or fasting blood glucose.

KEYWORDS: Obesity, weight loss, glucomannan, lipid profile.

INTRODUCTION

Obesity is abnormal or excessive fat accumulation that represents a health risk. A body mass index (BMI) over 25 is considered overweight, and over 30 is obese. The rates of obesity are increasing among adults and children, mostly in developing countries, where the rate of increment has been > 30% higher than that of developed countries.[1]

Obesity is the sixth risk factor contributing to the overall burden of disease worldwide. It leads to decreased life expectancy, mainly affecting the cardiovascular system and type 2diabetes mellitus with many cancers.[2]

In addition, there is a close association between obesity and depression.[3]

The most likely cause of obesity is high-calorie food intake with a lack of physical activity.[4] Many genetics, medical reasons, or psychiatric illnesses contribute to limited cases of obesity.[5]

Lifestyle changes, which include a low-calorie diet and exercise, are the primary treatment modality for obesity.[6,7]

Given the difficulties of dieting, many pharmacological treatments have a role in weight loss, like orlistat sibutramine, phentermine, and diethylpropion. Bariatric surgery should be restricted for patients with BMI ≥ 40 kg/m2 and who have obesity-related comorbidities (impaired glucose tolerance, diabetes mellitus, hypertension, sleep apnea, and dyslipidemia).[8]

The primary goal of treating obesity is to decrease cardiovascular-related problems in addition to weight loss.

Glucomannan, is a dietary supplement broadly used for its weight loss properties.

Raw glucomannan is a fermentable, soluble, and very viscous dietary fiber from the elephant because of its high ability to absorb water. Its chemical structure consists of an 8:5 mannose: glucose ratio linked by b-glycosidic bonds, which makes it the highest viscosity and molecular Weight of any other recognized dietary fiber.

Raw glucomannan is believed to delay gastric emptying, which prolongs the feeling of satiety, decreases body weight, reduces the consumption of sustenance that raise cholesterol and glucose concentrations, decreases the postprandial increase in plasma glucose, inhibits synthesis of cholesterol, and increases the excretion of cholesterol-containing bile acids in the stool.[9]

The study aims to evaluate the effectiveness and safety of glucomannan supplements in weight reduction in obese Iraqi adults.

MATERIAL AND METHODS

Study design

This prospective observational study was conducted at Alsader Medical City in AlNajaf, Iraq, from September 2023 to June 2024. We enrolled 50 obese participants with BMIs of more than 30 kg/m2. All participants completed the study. Participants were predominantly female.

Ethical approval

The current study was conducted according to the Declaration of Helsinki (as revised in 2013); informed consent was obtained from all the participants.

Participants and procedure

Fifty obese adults participated and completed the study; the subjective aspects were explained to the patients in Arabic. After careful history and examination of all participants, age, Weight, BMI, and waist circumference were recorded before the start of the study and either 4 or 8 weeks later. BMIs were calculated as follows: BMI = Weight (in kg)/(Height in m) 2.

Inclusion criteria

Iraqi adults with a BMI of more than 30 kg/m2.

Exclusion criteria

Patients with chronic disease or medical problems that lead to obesity, abnormal adrenal and thyroid function, diabetic patients, pregnant women, and those on medication that lead to obesity were excluded from the study.

Data collection

A fasting blood specimen was taken before the administration of glucomannan and 4 and 8 weeks later to assess lipid profile, blood sugar, liver enzymes, and renal functions.

5ml of participants' blood was preserved in a sterilized vacutainer tube and accurately labeled with a detailed code for each participant. The serum was used to measure the biochemical concentration of AST, ALT, total serum bilirubin, blood urea, serum creatinine, and lipid profile analyzed using Biosystem kits spin react on a Mindray BS-120.

There was an 8-week study period during which the participants were instructed to take 1 gm of glucomannan capsule with 250 mL of water one hour before breakfast, lunch, and dinner.

They were also instructed to preserve their usual dietary intake and physical activity levels.

The safety of glucomannan was assessed by recording any side effects during the study period and asking the participants about gastrointestinal symptoms like diarrhea, bloating, swallowing difficulties, belching, timing, and severity. In addition to liver enzymes and renal function assessment before initiation of the study and 4, 8 weeks later.

Statistical analysis

Statistical Package for the Social Sciences (SPSS) analyzed all data; summary data was presented as mean and standard deviation. The paired sample *t-test was* used to compare the last and bassline results value < 0.005, considered significant.

RESULTS

This prospective observational study was conducted at Alsader Medical City in AlNajaf, Iraq. Fifty participants, predominantly female, with BMIs of more than 30 kg/m2, were enrolled in the study.

The mean age of the participants was 30.43, with a mean BMI of 30.86 kg/m2 at baseline, 30.83±0.22 kg/m2 at four weeks, and 30.83±1.1 kg/m2 at week 8, p-value 0.84. There was no significant difference in mean weight at baseline, which was 84.36 kg; at four weeks, 84.21 kg; and at week 8, 84.27 kg, p-value 0.36.

The mean waist circumference at the bassline was 98.36 cm, 98.30 cm at week 4, and 98.32 cm at week 8, showing no significant difference in a p-value of 0.7.

The mean total cholesterol was 198.45 mg/dl at baseline, 193.34 mg/dl at week 4, and 191.4 mg/dl, with a significant difference, p-value 0.0001.

There was a significant difference in the mean of LDL cholesterol at eight weeks; the mean at baseline was

127.34mg/dl, 125.27 mg/dl at week 4, and 122.23 mg/dl at week 8, p-value 0.0001.

The mean HDL cholesterol was 41.35 mg/dl at baseline, 43.67 mg/dl at week 4, and 41.4 mg/dl at week 8, with no significant difference (p-value 0.1).

Before starting treatment, the mean of Triglycerides was 188.65 mg/dl, 186.12 mg/dl at week 4, and 188.58 mg/dl at week 8, with no significant difference, p-value 0.7.

The mean FBS at baseline was 101.23 mg/dl, 103.25 mg/dl at week 4, and 101.88 mg/dl at week 8, with no significant difference (p-value 0.1), as shown in Table 2.

Table 1: Baseline demographic and clinical data of the study participants.[50]

Characteristic:	Mean and SD
Male	19
Female	31
Age	30.43±0.23
BMI , kg/m^2	30.86±0.18
Weight, kg	84.36±0.56
Height, cm	166.45±0.934
Waist circumference, cm	98.36±0.75
Total cholesterol mg/dl	198.45±0.32
LDL cholesterol, mg/dL	127.34±0.89
HDL cholesterol, mg/dL	41.35±0.12
Triglycerides, mg/dL	188.65±0.88
FBS mg/dl	101.23±0.33

Table 2: Effects of glucomannan after 4, 8 weeks.

Characteristic	Baseline	4 weeks	8 weeks	P. value
BMI , kg/m^2	30.86±0.18	30.83±0.22	30.83±1.1	0.84
Weight, kg	84.36±0.56	84.21±0.12	84.27±0.41	0.36
Waist circumference, cm	98.36±0.75	98.30±0.11	98.32±0.68	0.7
Total cholesterol mg/dl	198.45±0.32	193.34±0.89	191.4±0.45	0.0001
LDL cholesterol, mg/dL	127.34±0.89	125.27±0.19	122.23±0.34	0.0001
HDL cholesterol, mg/dL	41.35±0.12	43.67±0.56	41.4±0.15	0.1
Triglycerides, mg/dL	188.65±0.88	186.12±0.23	188.58±1.3	0.7
FBS mg/dl	101.23±0.33	103.25±0.17	101.88±3.1	0.1

There was no significant difference in renal function test; blood urea was 20±1.38 mg/dl at baseline, 20.3±2.8 mg/dl at week 4, and 20.2±0.8 mg/dl at week 8 (p-value 0.3). Serum creatinine was 0.82±0.81 mg/dl at baseline, 0.84±0.2 mg/dl at week four, and 0.81±3.1 mg/dl at week 8 (p-value 0.93). Likewise, there were no significant differences in liver function tests at the beginning of the study and after eight weeks; AST was 16.3±1.2IU/L, 15.8±0.11IU/L and 15.9±2.1IU/L at baseline week 4, week 8, respectively (p-value 0.2). ALT was 18.2±1.1 IU/L at baseline, 17.9±0.2 IU/L at week 4, and 18±0.9 IU/L at week 8 (p-value 0.32). TSB was 0.95±0.7 mg/dl at the baseline, 0.92±2.1 mg/dl at week four, and 0.92±0.81 mg/dl at week (p-value 0.8). as shown in Table 3.

Table 3: Effect of glucomannan on liver and renal function.

Parameter	baseline	4 week	8 week	P value
Blood urea mg/dl	20±1.38	20.3±2.8	20.2±0.8	0.3
Serum creatinine mg/dl	0.82±0.81	0.84±0.2	0.81±3.1	0.93
AST IU/L	16.3±1.2	15.8±0.11	15.9±2.1	0.2
ALT IU/L	18.2±1.1	17.9±0.2	18±0.9	0.32
TSB mg/dl	0.95±0.7	0.92±2.1	0.92±0.81	0.8

AST aspartate transaminase, ALT alanine amino transaminase, TSB total serum bilirubin.

There were no serious side effects. Twenty-three participants had mild gastric discomfort, 12 participants had bloating, and 17 participants had diarrhea for a few days throughout the study period.

DISCUSSION

In this study, the administration of glucomannan did not affect the BMI, weight, or waist circumference at 4 or 8 weeks. The findings of our study are consistent with the findings of Joyce K. Keithly et al. in 2013, who found that glucomannan supplementation, did not promote weight changes or BMI.[10] In contrast to our study, several other studies have found positive effects of

glucomannan on weight loss.[11,12] The non-significant findings in our study may be explained by enrolling only healthy participants with moderate BMI who were not subjected to any dietary modification and change in their lifestyle.

In this study, there was a significant reduction in total serum cholesterol and LDL cholesterol, consistent with the results of many other studies according to a meta-analysis study in 2008, which included fourteen studies that concluded that glucomannan resulted in lowering total and LDL cholesterol. In contrast to this study, the current study found no significant reduction of serum triglyceride, weight, and fasting blood sugar. Both studies found no significant changes in serum HDL levels.[13]

The most likely explanation for decreasing serum cholesterol and LDL is decreasing gastric emptying, which reduces the absorption of dietary cholesterol and bile acid.[14]

The current study's results showed no significant effect of glucomannan on renal and liver function after eight weeks of treatment, and there were no serious side effects apart from gastrointestinal discomfort, bloating, and diarrhea, which is consistent with the findings of another study.[10]

In conclusion, Glucomannan supplements administered over eight weeks were safe and effective in decreasing serum cholesterol and LDL levels. Still, they did not affect weight or significantly change waist circumference, triglyceride, or fasting blood glucose.

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