



Beneficial effect of roasted flax seed (Alsi): an ancient medicine on weight loss of type 2 diabetes patients

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Abstract

This study is to conducted to observe roasted flaxseed (alsi) impact on 25-60 years age-group of 300 type 2 diabetic patients in district hospital Raipur (Chhattisgarh). The study shows flaxseed is a beneficial nutrients. Flax seeds rich source of dietary fibre: soluble and insoluble fibres, it's contains omega-3 fatty acid: alpha linolenic acid, poly unsaturated fatty acid, phytoestrogenic lignans, proteins, and an antioxidants. The roasted flaxseed (alsi) beneficial effect on blood sugar level and anthropometric changes in type 2 diabetic patients, the pre and post 3 months anthropometric test were measured by standards method. The roasted flaxseed (alsi) is beneficial medicine to weight loss and to maintain blood sugar level. According to analysis Patients gain healthy BMI, WHR, and blood sugar level in this study.

Keywords: Poly-unsaturated fatty acid, phytoestrogenic lignans, alpha-linolenic acid, dietary fibre, body mass index, waist-hip ratio.

Introduction

The Flaxseed is also known as linseed. The type-2 diabetes or diabetes mellitus is a chronic condition that affects the sugar level and the pancreas does not produce proper insulin¹. The Type 2 diabetes was previously called non-insulin-dependent diabetes. It is most common form of diabetes. It is the most common form of diabetes. Though obesity (excessive accumulation of body fat) increases the risk for this type of diabetes, it is also seen in normal adults. In this type of diabetes, apart from defects in insulin secretion, the insulin produced is not effectively used by the body due to a condition called 'insulin resistance'. In subjects with this type of diabetes, diet, exercise and oral anti-diabetic drugs may be enough to control the raised blood glucose².

Complications: Type 2 diabetes have some macro vascular (Large blood vessels damage) and micro vascular complications (small blood vessels damage), macrovascular complications included: Retinopathy (eye complications), neuropathy (nerve damage), nephropathy (kidney damage), micro vascular complications are: Dermopathy (skin disease), Cheiroarthropathy (Joints problem), Cardiomyopathy (heart disease).

Roasted Flax Seed (Alsi): Flax seeds scientific name is *Linum usitatissimum*. The name *Linum usitatissimum*, meaning "the most useful"³. Flaxseed is an important functional food ingredient because of its rich contents of alpha-linoleic acid (ALA, omega-3 fatty acid), lignans, and fibre. Flaxseed oil, fibres and flaxseed fatty acid lignans have potential health benefits such as in reduction of cardiovascular disease,

atherosclerosis, diabetes, cancer, arthritis, and osteoporosis, autoimmune and neurological disorders. Flax seeds helpful to control high blood pressure. Flax proteins help in the prevention and treatment of heart disease and strengthen the immune system. Flax seeds contain 29 percent carbohydrate and 95 percent fibre. 20 grams of flax seed contains about 6gms. dietary fibre. The Reference Daily Intake (RDI) of dietary fibre should be given for men and women 15–25% respectively. The total fibre composition is required in our body is 20–40% soluble fibre, 60–80% insoluble fibre. The soluble fibre helps to maintain blood sugar and cholesterol levels. And it's gut bacteria beneficial to improve digestion health. Flax seeds helpful to prevent constipation, and reduce risk of diabetes. A flax seed contains 18 percent protein⁴. Flax seeds rich source of arginine and glutamine essentials amino acids. These amino acids are essential for heart and immune system. Flax seeds are one of the richest dietary sources of alpha linoleic acid. Alpha linoleic acid is an essential fatty acid, and body cannot produce it. 10 grams of flax seed provides 4.3 grams of fat. The fat composition of 73 percent polyunsaturated fatty acid (PUFA), such as omega-6, omega-3 fatty acid, alpha-linoleic acid (ALA), 27 percent monounsaturated (MUFA) and saturated fatty acids. Omega-3 fatty acid is helpful to make heart healthy. Several vitamins like: thiamine (vitamin B1), and minerals like: copper, molybdenum, magnesium, and phosphorus are found in the flaxseed.

Serving size: 1 tables poon (14.3gms) flaxseed rich source of dietary fibre, vitamins, minerals and essential amino acids, essential fatty acids.

Flax seeds helpful to control the blood sugar level. Researchers has found in a study that people with type 2 diabetes that eat 10 grams of flaxseed in a day, for a month, the blood sugar level 8–20% automatically goes down. The flax seeds' contains insoluble fibre, insoluble fibre helpful to slows down the release of sugar in the blood, overall, flax seeds can be a beneficial and nutritious addition in daily diet of people with type 2 diabetes. Flax seed helpful to weight control⁴. 2.5 grams of ground flax fibre reduced feelings of appetite. The feelings of reduced hunger were likely due to the soluble fibre content of flax seeds. It slows digestion in the stomach⁵. Flax seeds dietary fibre helpful in manage weight. Flax seeds are a great source of plant-based protein; Flaxseed protein is rich in the amino acids arginine, aspartic acid and glutamic acid. They contain high-quality protein.

According to “Journal of medicinal food”. The ingestion of flax fibre in healthy individuals leads to improved blood glucose level⁶.

Aims and Objectives: i. To study the effect of roasted flaxseed (alsi) in maintaining BMI and weight loss. ii. To know the impact of roasted flaxseed (alsi) on type 2 diabetes patient WHR ratio in Raipur. iii. To study the existing knowledge of patients about roasted flaxseed (alsi).

Methodology

This prospective study was conducted on 25-60 years age group of type 2 diabetes patients. The Patients were selected from NCD (Non communal disease) Clinic district hospital, and other hospital of Raipur Chhattisgarh. The study design was survey and informal experimental design. The sample size was taken 300 male and female patients in this study. Written consent letter from all the patients and institutional ethical committee was also taken in this study. The 300 patients were advised to add *roasted* flaxseed (alsi) 10g, as a snack meal in a regular diet twice a day for 3 months. The patients were keeping under Doctor’s Prescription. Assessment of nutritional status of an individual was done by following these methods: Anthropometric measurement: BMI (body mass index), Waist/Hip Ratio Fasting and random blood glucose, were analysed by standard methods. We have used data from those patients who already have their own blood profile examination. The examination was done before and after intervention between the gaps of 3 months. Diet survey was conducted to help measure nutrients, foods or eating habits. Dietary survey was done by using food frequency questionnaire method. Booklet contains importance of nutrition, Low GI (Glycemic Index) food and a healthy food practice was developed with nutritionist, doctors, housewives and professionals. The booklet is useful for further standardized for its reliability and validity. Importance of functional foods and herbs was suggested through these booklets. The effect of nutrition education on type-2 Diabetic Patients, lifestyles, and daily routine etc. was analyzed in the research work. The obtained data was analyzed and the

differences in the mean of various parameters were compared. The results were statistically by mean, percentage, test using SPSS software.

Results and discussion

Nutrition facts of roasted flax seed (alsi) amounts: 100gm/534Kcal.

Table-1: One tablespoon (14.3gm) of roasted flax seeds contains the following nutrients.

Nutrition	Gm
Carbohydrates	2.0 gm
Protein	1.3 gm
Fibre	1.9 gm
Fat	3.0 gm
Saturated fat	0.3 gm
Mono unsaturated Fatty Acid	0.5 gm
Poly unsaturated Fatty Acid	2.0 gm
Omega-3fatty acids	1.5 gm

Discussion: According to findings of the study one tablespoon or 14.3gm of roasted flaxseed (alsi) rich source of healthy fat, antioxidants, low calories and dietary fibre. The seed contain protein, lignans, and the essential fatty acid alpha-linoleic acid, also known as ALA or omega-3 fatty acid. The flaxseed effect on type 2 diabetes in lower age group 25-45 patient’s very beneficial compare to other age group and maintained the healthy BMI, WC and WHR in male and in female. Total 65 percent male and 55 percent female have seen very positive results like; maintaining healthy weight and recovering from type 2 diabetes. The 50.33 percent patients gain healthy weight, 44.33patients gain healthy WHR. The 57.00 percent get normal blood sugar level. The Patient’s attitudes found very positive related to flaxseed and they said that flaxseed is helpful to control diabetes.

Conclusion

The present study revealed that the diabetic patients of the Raipur city suggested that eating 1 tablespoon of roasted flaxseed (alsi) every day. Roasted flaxseed (alsi) is very helpful to lower high blood glucose level in type-2 diabetes. A roasted flaxseed (alsi) is a light snack and contains considerably low calories. If eat one tablespoon of roasted flaxseed (alsi) in a day, probably consume half of daily required protein and fibre body needs, and that too without taking extra calories. In type 2 diabetes disease daily fibre intakes of 20 - 35g/1000 kcals is

necessary in a day. Basically, flaxseed (alsi) is rich insoluble fibre and proteins are essential nutrients for weight loss. Diabetes is a metabolism disease. Roasted flaxseed (alsi) is helpful to improve metabolism and prevent the digestive problems. The essential fatty acid ala, pufa, phytoestrogens antioxidants, dietary fibre, low carbohydrate and rich amino acids are helpful to reduce the risk of diabetes, because of an anti-inflammatory effect. 10g of flaxseed had lower glucose and insulin levels and improved insulin sensitivity in the patients. After 3 months the patients have seen very positive results in BMI, WHR, and blood sugar level.

The blood sugar level of type-2 diabetics Patients were reduced by an average of 90-130mg/dl within 3 months. Roasted flaxseed (alsi) was found to be effective in patients. Roasted flaxseed (alsi) shows significant changes in diabetic patients. Roasted flaxseed (alsi) decreased weight, WHR, body mass index after 3 months intervention in patients with type 2 diabetes Roasted flaxseed (alsi) reduced blood sugar level in patients. Therefore, roasted flaxseed (alsi) is a healthy snack to eat. Roasted flaxseed (alsi) is a great food for people with diabetes as their low glycaemic index. Therefore, it maintains the blood glucose level in the body.

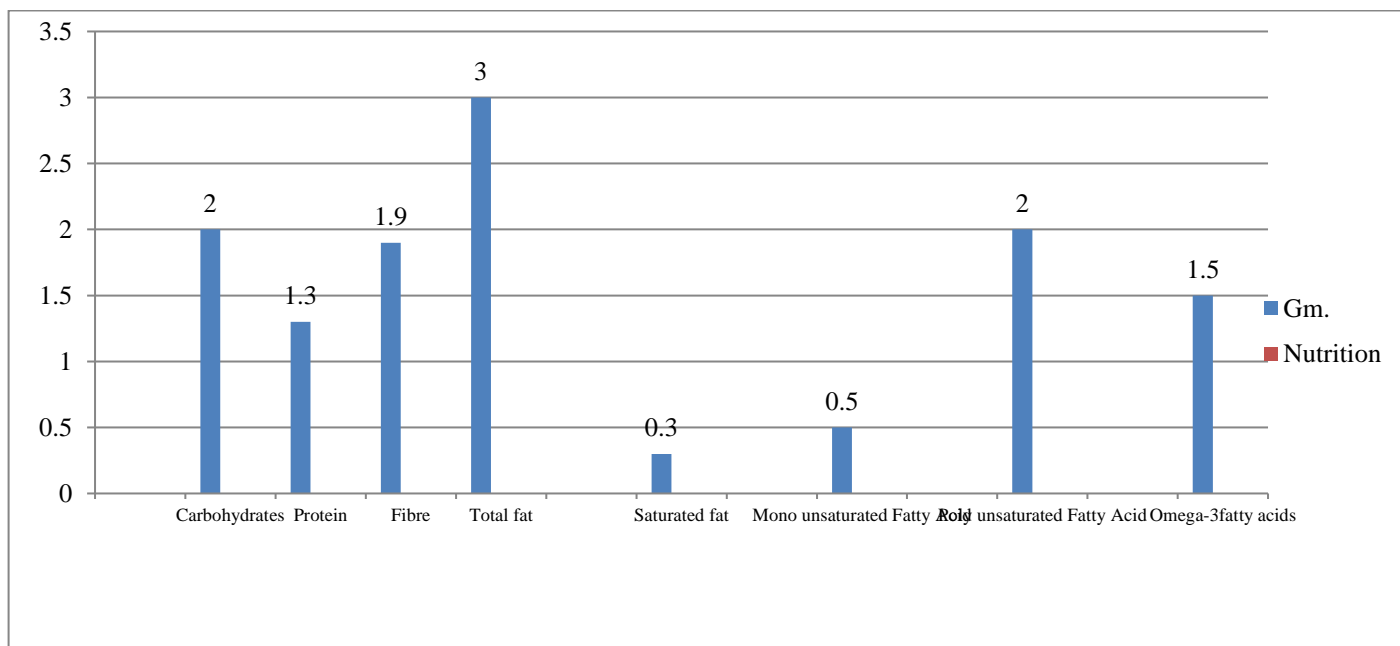


Figure-1: Nutrition Facts of Roasted Flax seed (alsi).

Table-2: According to age-group benefited type-2 diabetes patients.

Age group	Male Patient's=150		Female Patient's=150	
	Selected Patients	Benefited Patients	Selected Patients	Benefited Patients
25-30	20	17	20	15
30-35	20	17	20	12
35-40	20	15	20	14
40-45	20	13	20	11
45-50	25	14	25	13
50-55	25	11	25	12
55-60	20	10	20	11
Total	150	97	150	88
Mean		40.74		41.76
Percentage		64.67		58.67
Coefficient of Correlation		-0.34		-0.074

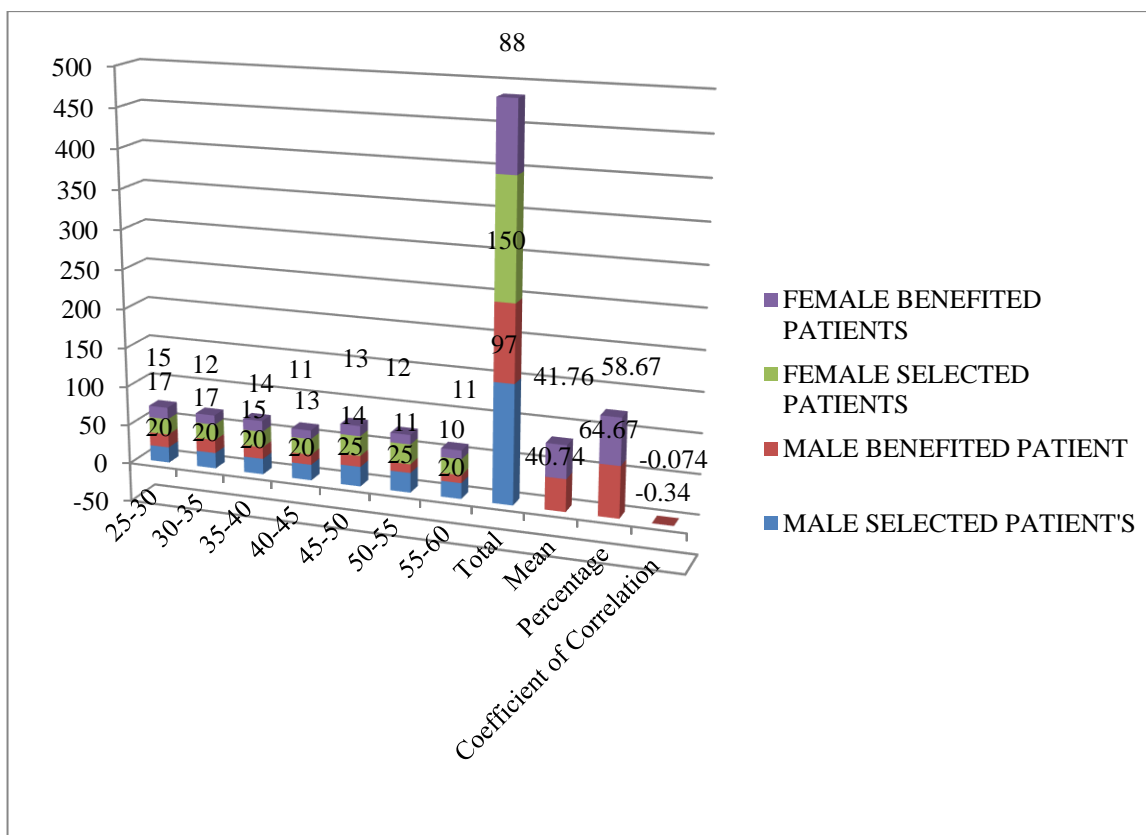


Figure-2: Benefited type-2 diabetes patients.

Table-3: Effect of roasted flaxseed (alsi) on Patient's waist circumference according to age group.

Age-group	Male=150	<0.85cm	Female=150	<0.80cm
	No. of Patients	Waist circumference	No. of Patients	Waist circumference
25-30	15	0.85	13	0.78
30-35	14	0.82	14	0.77
35-40	16	0.83	10	0.76
40-45	16	0.84	13	0.79
45-50	12	0.81	11	0.80
50-55	13	0.80	12	0.75
55-60	11	0.79	9	0.74
Total	97		82	
Percentage	64.66		54.67	
Mean		41.57		41.59
Mean Deviation		-0.93		-0.91

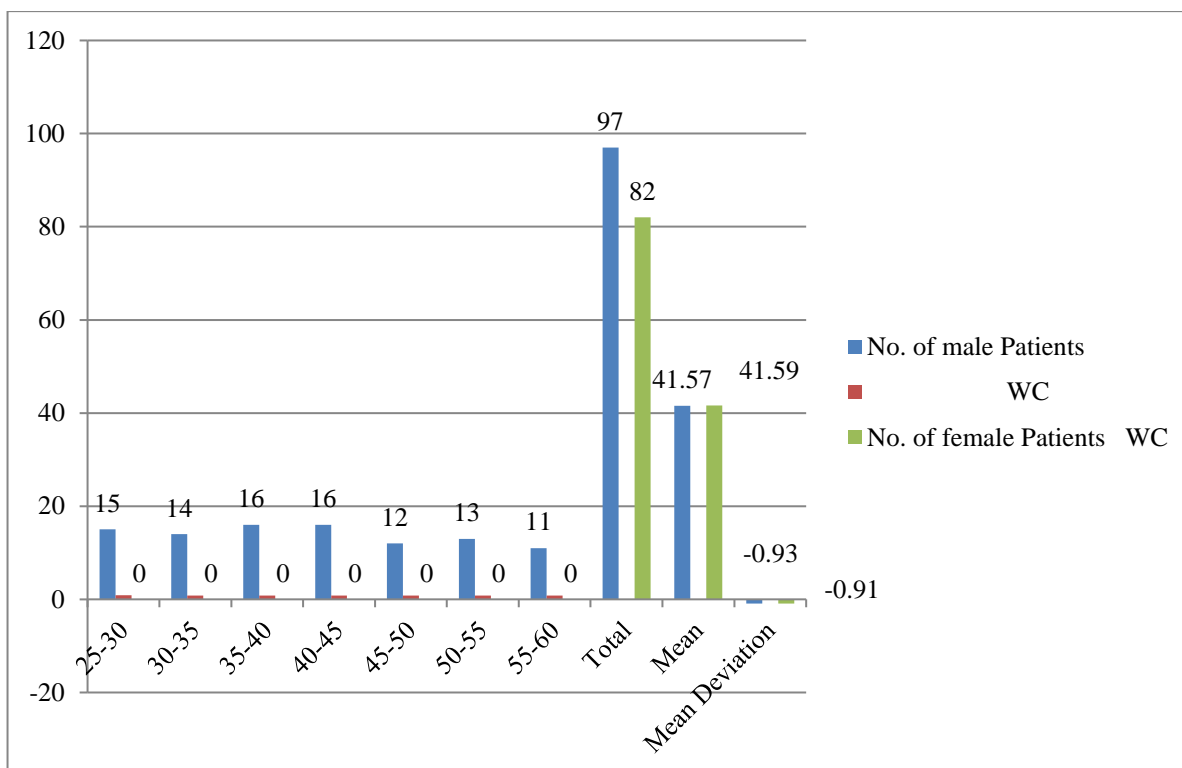


Figure-3: Patient's waist circumference (WC).

Table-4: Effect of flaxseed (alsi) on anthropometric characteristics of type 2 diabetes.

Anthropometric Characteristics		Male (n=150)		Female (n=150)		Total (n=300)
BMI(kg/m ²)	18.5-24.9	78	52.00	73	48.67	151 (50.33)
	25-29.9	43	28.67	50	33.33	93 (31.00)
	30<	29	19.33	27	18.00	56 (18.67)
WHR						
Normal						
Male	Female	69	46.00	64	42.67	133 (44.33)
<0.90	<0.8					
Overweight						
Male	Female	47	31.33	51	34.00	98 (32.67)
0.80-0.84	0.90-0.99					
Obese						
Male	Female	34	22.67	35	23.33	69 (23.00)
>1.00	>0.85					

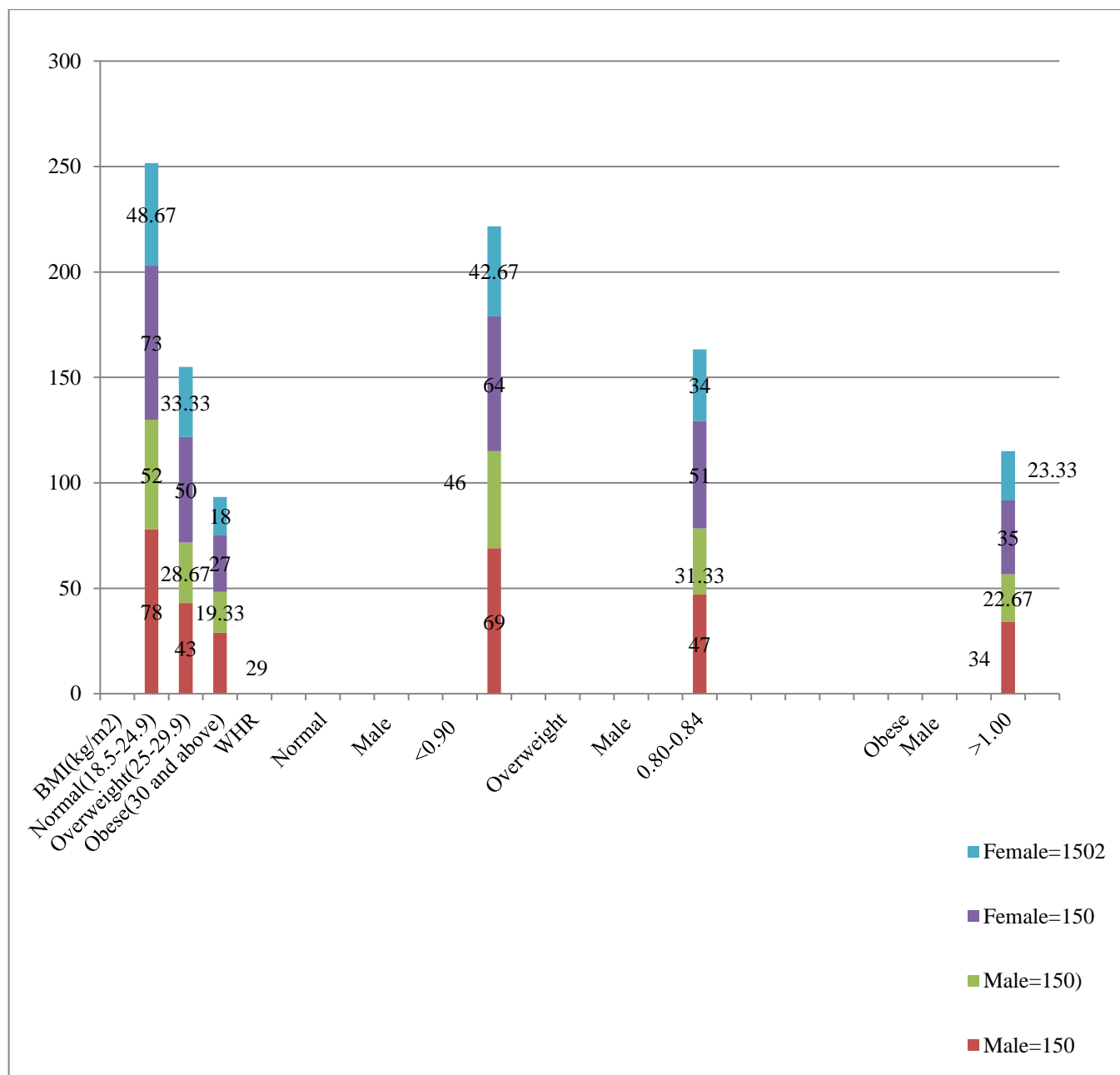


Figure-4: Patient's Anthropometric characteristics.

Table-5: Effect of roasted flaxseed (alsi) on Waist/Hip Ratio in type 2 diabetes patients.

WHR/Sex cross tabulations	WHR Normal Range	No. of Patients	Total
Male	Above 0.9	69 (46.00)	150 (50.00)
	Below 0.9	81 (54.00)	
Female	Above 0.8	71 (47.33)	150 (50.00)
	Below 0.8	79 (52.67)	

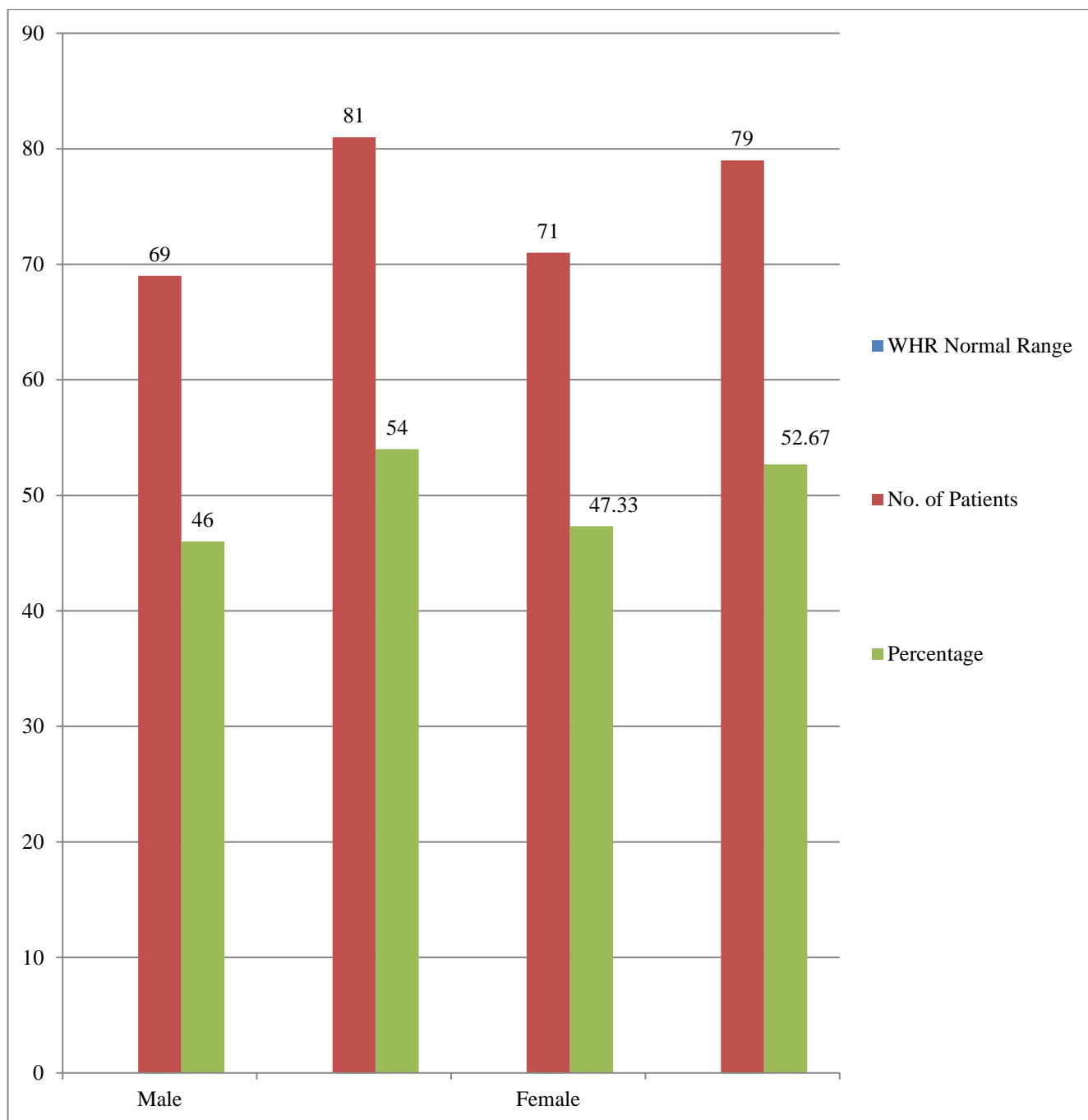


Figure-5: Patient's Waist/Hip Ratio (WHR).

Table-6: Effect of Roasted flaxseed (alsi) on blood glucose level.

Blood glucose level	No. of Patients
<90-130mg/dl	171(57.00)
>90-130mg/dl	129(43.00)
	300(100.00)

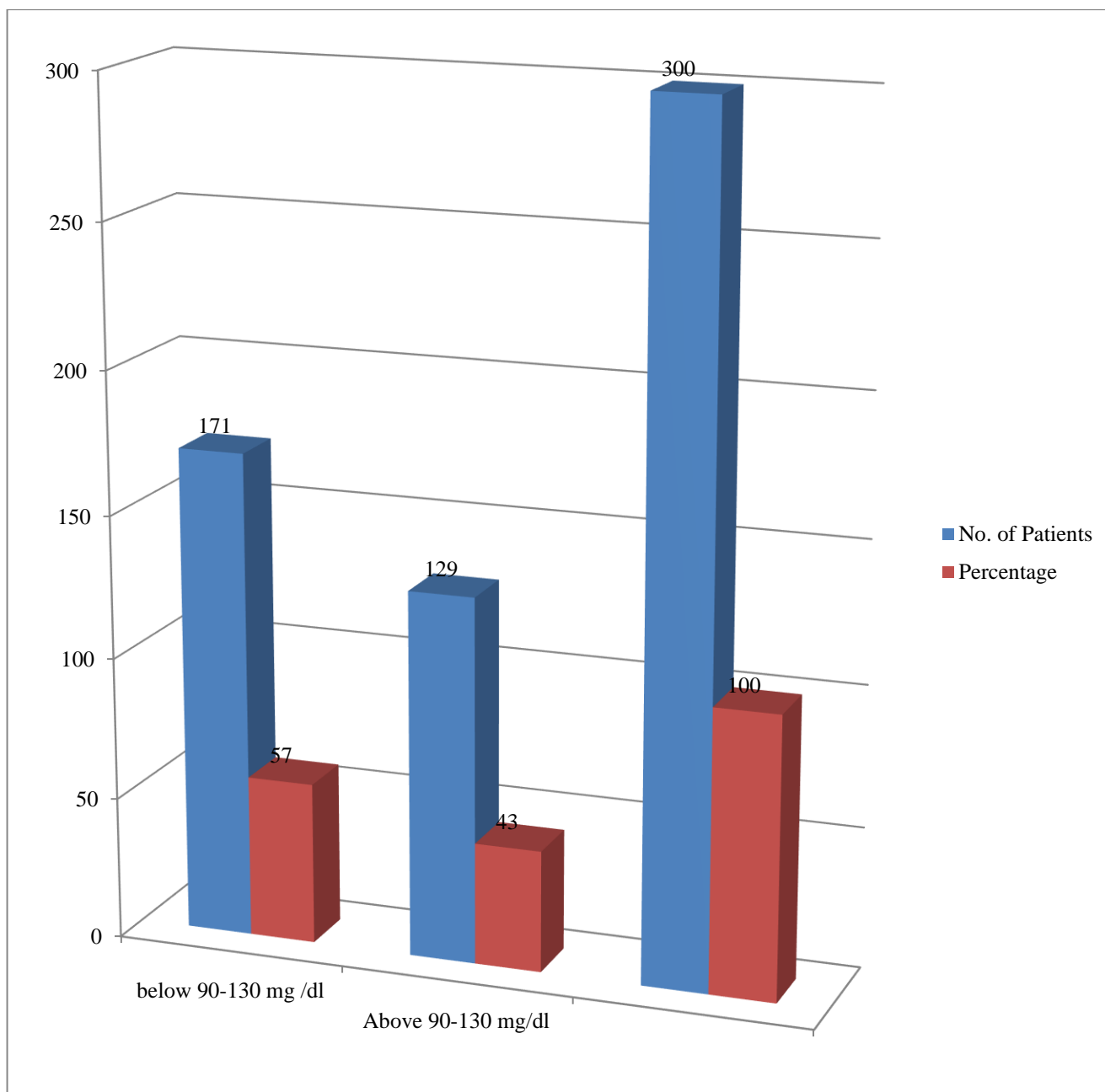


Figure-6: Patient's blood glucose level.

Table-7: Patients existing knowledge regarding roasted flaxseed (alsi).

Knowledge related Questions	Yes	No	Total
Do you know roasted flaxseed (alsi) is helpful to control diabetes ?	142 (47.33)	158 (52.67)	300 (100.00)
Do you know normal level of sugar in the blood ?	188 (62.67)	112 (37.33)	300 (100.00)
Do you know yoga is beneficial in the diabetes ?	260 (86.67)	40 (13.33)	300 (100.00)
Do you know obesity is associated with sugar ?	203 (67.67)	97 (32.33)	300 (100.00)

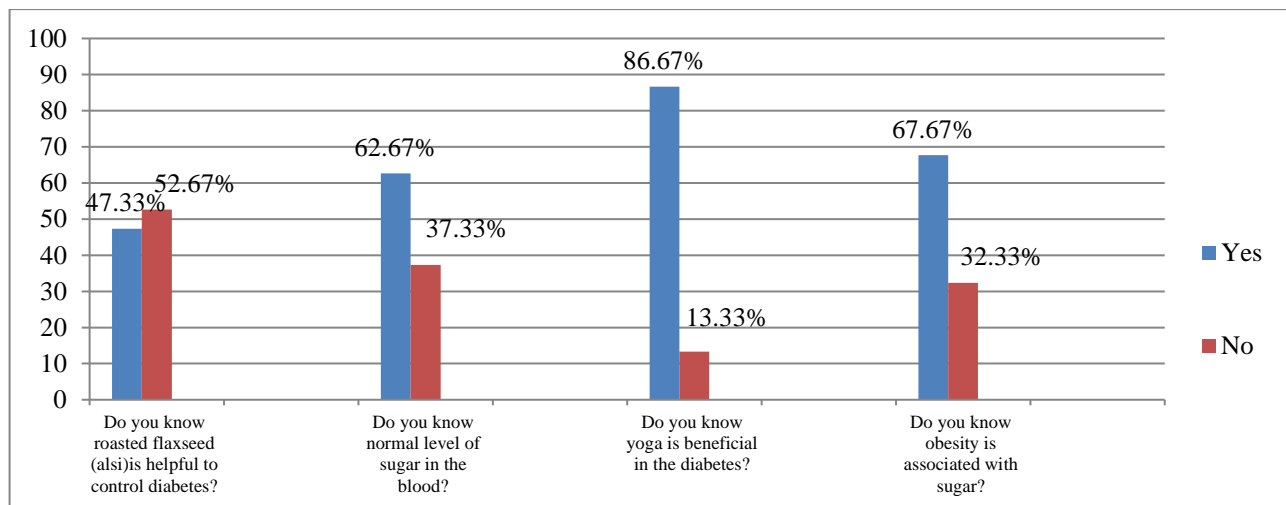


Figure-7: Patient's Attitudes.

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