

## **Effect of supplementation of oats porridge on lipid profile of the hypertension subjects**

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### **ABSTRACT**

Oats considered as Nature's Super Grain. They are a great source of dietary fiber consisting of approximately 55% of soluble fiber and 45% insoluble fiber. Oats like other grains and vegetables contain hundreds of photochemical. The soluble fiber and the antioxidants present in oats normalize blood pressure. (Keenan, 2002). Keeping this in view present study was undertaken to see the "Effect of Oats in lowering the Blood pressure". Around 30 subjects were randomly selected as sub sample for in depth study and drawn into two equal groups each 15 as experimental group and control group. For the experimental group oats porridge (35g) was supplemented for 45 days in order to study the effect of supplementation on lipid profiles and blood pressure. The results revealed that there was a decrease in blood pressure and lipid profiles after supplementation. By the supplementation of oats porridge reduction in systolic blood pressure was seen from 168.66 mmHg to 165.2 mmHg and diastolic pressure from 102.53 mmHg to 100.8 mmHg. Among lipid profiles cholesterol level were reduced from 162.2 mmHg to 156 mmHg, triglycerides levels were decreased from 125.86 mmHg, VLDL levels were decreased from 25.13 mmHg to 24.2mmHg and LDL levels were decreased from 103.46 mmHg to 95.4 mmHg. When experiment groups were compared with control group, the blood pressure and lipid profile levels showed a significant decreased level.

**KEY WORDS:** Hypertension, lipid profile, oats, supplementation

### **INTRODUCTION**

High blood pressure, commonly known as Hypertension, is not a disease but only a symptom indicating that some underlying disease is progressing. When the heart pumps blood through blood vessels, it pushes the blood against the wall is called the blood pressure. The elevation of the blood pressure above normal is called hypertension. It is a major risk factor contributing to coronary heart disease. The incidence of hypertension varies from country to country. Hypertension, or high blood pressure, is not a disease but rather a measurement of what may be an unhealthy

physical condition. It is a symptom that accompanies many forms of heart and kidney disease. Blood pressure needs to be controlled mainly to prevent cardiovascular disease. Kidney disease, strokes and related declines in brain function, poor blood circulation in the legs, problems with vision, and sudden death.

In India, cardiovascular diseases (CVDs) are estimated to be responsible for 1.5 million deaths annually. Indeed, it is estimated that by 2020, CVDs will be the largest cause of mortality and morbidity in India. Hypertension is a major risk factor for CVDs, including stroke and myocardial

infarction, and its burden is increasing disproportionately in developing countries as they undergo demographic transition. It was estimated that around two-thirds of those with people with hypertension worldwide were living in developing countries (639 million) in 2000, and that this would rise to three-quarters living in developing countries (1.15 billion) by 2025 (The World Health Report 2002).

Studies have suggested that eating oats diet provides a wide range of important health benefits. Oats rich in soluble fiber can reduce hypertension or high blood pressure and so reduce the need for anti-hypertensive medication. They considered to be Nature's Super Grain. New research has also discovered that the antioxidants found in oats reduce cholesterol by reducing the ability of blood cells to stick to the inside of artery walls. Oats and its products play a vital role in dealing hypertension cases, the soluble fiber and the antioxidants present in oats normalize blood pressure (Keenan, 2002).

Oats like other grains and vegetables contain hundreds of photochemical. Many photochemical are thought to reduce a person's risk of getting cancer. Oats have a high fiber content which is necessary in keeping bowel movements regular. Oats and oat-based products can help to significantly lower cholesterol re-absorption. Because of their natural cholesterol lowering properties, as well as the numerous 'super' benefits they offer for the body's overall health and wellbeing. They provide sustained energy and help feel fuller for longer, and scientific evidence revealed that they may reduce the risk of increased blood pressure.

Hence, the present study was undertaken to see the effect of oats porridge

in lowering the Blood pressure especially to study the lipid profiles of the selected subjects before and after supplementation.

## MATERIALS AND METHODS

Oats are a great source of dietary fiber – they consist of approximately 55% soluble fiber and 45% insoluble fiber. It contain a high percentage of desirable complex carbohydrates, which have been linked to reduce risk of colon, breast, and prostate cancer; better management of diabetes and fewer bowel problems such as constipation. Thus oats reduce both blood pressure and cholesterol. (Noakes et al., 1999).

### *Selection of sample*

Fifty hypertensive subjects (without any other complications) were selected after scrutinizing their lipid profiles, their age group and after testing for any other diseases from the different households. A random sample of 30 hypertension subjects was chosen for in depth study.

### *Product development and sensory evaluation*

The prepared porridge was standardized by repeated trails in the laboratory and by checking the organoleptic characteristics through semi trained panel members. Sensory evaluation of food is important in assessing the acceptability of any new food products which was carried out by sensory tests. Sensory evaluation of food includes different senses like eyes (visual), nose (olfactory), ears (auditory) and mouth (tactile).

**Supplementation:** Supplementation is main part of the study. The samples were

divided into 2 groups after the pre analysis of lipid profiles and control group was kept without any supplementation. The supplementation was done for 45 days i.e. 1 1/2 month.

The results of pre and post analysis were statistically analyzed.

**Results and Discussion**

The age and sex are the most important factors to be considered for assessing the nutritional status. The data in table.1 represents percent distribution of

subjects according to age and sex. It is clear from the table that the most hypertensive subjects were in the age group of 35-45 yrs of age (57%) and majority of the hypertensive subjects were female (57%).

This findings are on par with the Paul Greer’s (2007), statement who stated high blood pressure is more likely in men over 35 and women in age of 45 and women are more likely to have high blood pressure than men when they are in menopausal stage.

**Table 1: Percentage distribution of the subjects according to age and sex**

S.NO	AGE	TOTAL N=30	CONTROL N=15	EXPERIMENTAL N=15
1	35-45	17(57)	9(60)	8(55)
2	45-55	8(27)	3(20)	5(33)
3	>55	5(17)	3(20)	2(13)
	SEX	TOTAL N=30	CONTROL N=15	EXPERIMENTAL N=15
4	MALE	13(43)	8(53)	5(33)
5	FEMALE	17(57)	7(47)	10(67)

Figure in parentheses indicates percentage.

**Demographic features**

The demographic features of the selected subjects are given in table 2. It

includes occupation, educational status, income, family size, type of family, religion.

**Table 2: Percentage distribution of subjects according to demographic features**

S.NO	ASPECTS	TOTAL N=15	CONTROL N=15	EXPERIMENTAL N=30
<b>1</b>	<b>EDUCATIONAL LEVELS</b>			
	Illiterates	15(50)	5(35)	10(67)
	Primary Education	7(23)	6(40)	1(7)
	Secondary Education	2(7)	1(7)	1(7)
	Graduation	1(3)	-	1(7)
	Post Graduation	5(17)	3(20)	2(13)
<b>2</b>	<b>OCCUPATION</b>			
	Government Employee	10(33)	6(40)	4(27)
	Non-Government	9(63)	7(47)	2(13)
	Other	11(37)	2(13)	9(60)
<b>3</b>	<b>INCOME</b>			
	Below Rs 5,000	9(30)	5(33)	4(27)
	Rs 5,000 to Rs 10,000	16(53)	6(40)	10(67)
	> 10,000	5(7)	4(27)	1(7)
<b>4</b>	<b>FAMILY SIZE</b>			
	Two	1(3)	-	1(7)
	Three	2(7)	1(7)	1(7)
	Four	9(30)	4(27)	5(33)
	Five	8(27)	4(27)	4(27)
	> Five	10(33)	6(40)	4(27)
<b>5</b>	<b>TYPE OF FAMILY</b>			
	Nuclear family	21(70)	9(60)	12(80)
	Joint family	9(30)	6(40)	3(20)
<b>6</b>	<b>RELIGION</b>			
	Hindu	28(93)	13(87)	15(100)
	Christian	2(7)	2(13)	-

Figure in parentheses indicates percentage.

The data in table 3 depicts the distribution of subjects according to BMI (Body Mass Index) and physical activity of the selected subjects. It is clear from the table that majority (77%) of the subjects had normal BMI level. Only 10% of them seem to be over weight. BMI of the

individuals depends upon the type of life style. The term 'life style' is rather a diffuse concepts often used to denote the way people live, reflecting a whole range of social values, attributes and activities (Park, 1995). The data reveals that majority of the subjects (83%) are doing moderate work.

**Table 3: Percentage distribution of subjects according to BMI**

S.No	ASPECTS	TOTAL N=30	CONTROL N=15	EXPERIMENTAL N=15
<b>1</b>	<b>BMI</b>			
	< 18.5 under weight	4(13)	3(20)	1(7)
	18.5-25 normal	23(77)	10(67)	13(87)
	25 – 30 overweight	03(10)	2(13)	1(7)
	> 30 obesity	-	-	-
<b>2</b>	<b>PHYSICAL ACTIVITY</b>			
	Sedentary	1(3)	-	1(7)
	Moderate	25(83)	12(80)	13(87)
	Heavy	4(13)	3(20)	1(7)

Figure in parentheses indicates percentage.

**Effect of supplementation of developed product on blood pressure:**

The nutrients present in developed oat porridge are energy, carbohydrates, fiber, protein, minerals. Blood pressure apparatus (sphygmomanometer) used to read the blood pressure of patients. In blood

pressure reading, the first figure indicates systolic blood pressure and the second figure indicates diastolic pressure. The systolic pressure represents arterial pressure caused by the contraction of the left ventricle of the heart. The diastolic pressure is the arterial pressure. The Normal blood pressure is 120/80 mm Hg.

**Table 4: Comparisons of Mean values of systolic blood pressure between experimental (with supplementation) and control (without supplementation) before and after intervention**

GROUP		BLOOD PRESSURE MEAN ± SD	T – VALUE
EXPERIMENTAL GROUP	B	168.66 ± 3.29	2.19*
	A	165.2 ± 4.11	
CONTROL GROUP	B	167.73 ± 4.93	2.62*
	A	164.8 ± 4.32	

NS = Not Significant

\* = Significant at 5% level

\*\* = significant at 1% level

B= Before Supplementation (Baseline values)

A = After supplementation (Post intervention)

The data from the table 4 represents mean systolic blood pressure levels of the experimental group before and after supplementation with 35gm of oat porridge, indicating decrease in the systolic blood

pressure from 168.66mg/dl to 165 mg / dl. and the control group without supplementation from 167.73mg/dl to 164.8 ± 4.32 mg/dl respectively . The values are statistically significant at 5% level.

**Table 5: Comparisons of Mean values of diastolic blood pressure between experimental (with supplementation) and control (without supplementation) before and after intervention**

GROUP		BLOOD PRESSURE MEAN ± SD	T – VALUE
EXPERIMENTAL	B	102.53 ± 2.15	4.03*
	A	100.8 ± 3.96	
CONTROL	B	105.93 ± 1.14	NS
	A	104 ± 1.74	

NS = Not Significant

\* = Significant at 5% level

\*\* = significant at 1% level

B= Before Supplementation (Baseline values)

A = After supplementation (Post intervention)

Table 5 shows the mean blood pressure levels (diastolic blood pressure) of the experimental group with supplementation with oat porridge, and control group without supplementation. It was observed that there were decrease in the diastolic blood pressure from 102.53 mmHg to 100.8 mmHg in the experimental group and these values are statistically significant

at 5% level, where as in control group there is no significant decreased observed.

The study results are on par with Keenan et al. (2002) who reported that eating oatmeal can reduce systolic pressure by as much as 7.5 points and diastolic pressure by 5.5 points. Adding oat cereals to daily diet can reduce the risk of developing high blood pressure and help treat the condition already developed.

**Table 6: Comparison of mean serum lipid profiles within the experimental group**

Lipid profiles within the experimental group	Values before supplementation (Mean ± Sd)	Values after supplementation (Mean ± Sd)	Difference mg/dl	t-value
Serum Cholesterol (mg/dl)	162.2 ± 16.19	156 ± 18.99	6.2	NS
Serum Triglycerides(mg/dl)	125.86 ± 32.59	120.73 ± 20.33	5.13	NS
Serum HDL(mg/dl)	35.66 ± 4.76	40 ± 2.6	4.34	4.27**
Serum VLDL(mg/dl)	25.13 ± 6.52	24.2 ± 4	0.93	NS
Serum LDL(mg/dl)	103.46 ± 15.42	95.4 ± 13.72	8.06	2.33*

NS = Not Significant

\* = Significant at 5% level

\*\* = Significant at 1% level

B = Before Supplementation

A = After Supplementation

The data in table 6 gives information about comparison of mean serum lipid profiles within the experimental group before and after supplementation with 35gm of oat porridge. When Oats porridge was supplemented to the selected subjects the mean values of serum cholesterol decreased from 162.2 mg/dl to 156 mg/dl with a decrease of 6.2mg/dl, similarly triglycerides from 125.86 mg/dl to 120.73 mg/dl with a decrease of 5.13mg/dl, and VLDL 25.13 mg/dl to 24.2 mg/dl, the differences observed for total cholesterol, triglycerides, VLDL levels were not statically significant, where as for LDL a marked decrease was observed from 103.46

mg/dl to 95.4 mg/dl with a difference of 8.06mg/dl at 5% level respectively.

From results it was also observed that there was a significant difference in serum HDL, from 35.66 ± 4.76 mg/dl to 40 ± 2.6 mg/dl which increased with 4.3mg/dl at 1% level significantly, The results are on par with Braaten et al. (1999) who stated that the main component present in oats is fiber which is rich in beta-glucan it is significantly reduces the LDL cholesterol levels of the hypertension subjects and it increases the good cholesterol of HDL levels.

**Table 7: Comparison of mean serum lipid profiles within the control group**

Lipid profiles within the control group	Values before intervention (Mean $\pm$ Sd)	Values after intervention (Mean $\pm$ Sd)	Difference	t-value
Serum Cholesterol (mg/dl)	128.6 $\pm$ 24.11	126 $\pm$ 12.5	2.6	3.47**
Serum Triglycerides(mg/dl)	127.66 $\pm$ 14.3	121.66 $\pm$ 15.4	6	4.58**
Serum HDL(mg/dl)	34.6 $\pm$ 3.62	33.93 $\pm$ 3.96	0.67	1.38NS
Serum VLDL(mg/dl)	25.53 $\pm$ 2.87	24.33 $\pm$ 3.09	1.2	4.61**
Serum LDL(mg/dl)	84.8 $\pm$ 19.93	82.06 $\pm$ 18.87	2.74	4.34**

NS = Not Significant; \* = Significant at 5% level; \*\* = Significant at 1% level

It was also found that there is significant difference from initial to final levels such as in serum Total cholesterol, Triglycerides, VLDL, LDL at 1% level respectively, in control group, but there was no significant difference observed in HDL levels although there was a downward trend in all lipid measures, which might be due to anti hypertensive medication among the control group even without supplementation (Table 7).

## CONCLUSION

Oats a great source of dietary fiber consists of approximately 55% soluble fiber and 45% insoluble fiber. In addition to fiber, mineral content and grain anti oxidants may also contribute to favorable blood pressure.

In Oats, the soluble fiber beta-glucan is the major active cholesterol-reducing component lowering blood cholesterol levels via the formation of a viscous gel. This binds bile acids and increases their excretion within the feces. Soluble fiber may also delay gastric emptying and reduce postprandial insulin concentrations, which also inhibit cholesterol biosynthesis. Many of the pharmacologic agents, however, are costly and are associated with substantial adverse effects. As a result, interest has been increasing in alternative methods to prevent and treat hypertension. Clinical trials using dietary interventions for the alleviation of Hypertension and observational studies have suggested that a number of foods and specific food components may exert an antihypertensive effect.

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