

## EFFECTS OF COARSE GRAINS ON WEIGHT OF TYPE II DIABETIC PATIENTS IN URBAN AREA OF BHOPAL (M.P)

MS.NEETUPAL<sup>1</sup> & MEENALPHADNIS<sup>2</sup>

<sup>1</sup>Research scholar, Home Science, Barkatullah University, Madhya Pradesh, India

<sup>2</sup>Professor, GovernmentMaharaniLaxmibai Girls (Autonomous) College, Madhya Pradesh, India

### ABSTRACT

The benefits of coarse grains, one or many, had been researched in past to prove their beneficial effects on Type II diabetes, weight, CVD, B.P. But, no research had been done on collective effect of all coarse grains (black gram, cracked wheat, corn meal, millets, pulses, oats, soy) on weight of type II diabetic individuals. So, this topic is chosen for research on finding the need of this research for type II diabetic individuals. The hypothesis is that there will be no effect of coarse grain on weight of type II diabetic patients of urban area of Bhopal. The result shows decrease in average BMI and difference of weight of experimental group whereas average increase in BMI and difference of weight of control group. Conclusion:- Consumption of coarse grains on regular basis helps in reduction in weight of type II diabetes individuals.

**KEY WORDS:** Black Gram, Cracked Wheat, Corn Meal, Millets, Pulses, Oats, Soy, Type II Diabetic Patients, Weight

### INTRODUCTION

The prevalence of diabetes is increasing in word and India tremendously, soon making India a diabetic hub (Joshi SR et al 2007, Kumar A et al 2013). Hence, the need of widely applicable strategies to reduce diabetes and the complications associated with it. Diabetes is a metabolic syndrome (Walter Willet et al 2002), which bring along many complications like obesity, CVD, high B.P. In past researches, it was proven that, if weight of type II diabetic patient is controlled, then its sugar can also be controlled or managed.

Diet plays a vital role in weight management of any individual. If the diet of any individual, even diabetic is planned properly, can make that individual manage his weight. In this respect, coarse grains play a vital role as Indian diet, mostly composed of coarse grains in one or other form.

In this research, coarse grains were considered as all dried grains (pulses and cereal) consumed either in powdered form, or broken, but with its all physical components intact, as whole grain atta, cracked wheat etc. The whole consist of so many vital nutrients, which help in reducing weight of type II diabetic patients, which are mentioned below

### THE MAIN BENEFITS OF WHOLE GRAIN

The benefits of whole grains, most documented by repeated studies include:

- stroke risk reduced 30-36%
- type 2 diabetes risk reduced 21-30%

- heart disease risk reduced 25-28%
- better weight maintenance
- Other benefits indicated by recent studies include:
- reduced risk of asthma
- healthier carotid arteries
- reduction of inflammatory disease risk
- lower risk of colorectal cancer
- healthier blood pressure levels
- less gum disease and tooth loss
- Rich in energy-giving carbohydrates, with a low glycemic index rating for blood glucose control.
- A good source of B-group vitamins (especially foliate), iron, zinc, calcium and magnesium.
- Abundant in fibre, including both insoluble and soluble fibre, plus resistant starch for colonic health benefits.

### **THE MAIN BENEFITS OF PULSES**

Top of Form

Dietary fiber has a range of health benefits:

- Lower risk of heart disease
- Manage and reduce risk of type 2 diabetes
- Protect against colorectal cancer
- Reduced risk of early death
- Reduced inflammation
- Improved weight control
- Improved digestive health
- lower risk of digestive disorders
- Enhanced immune function (grains & legumes nutrition council 2016)

Despite so many health benefits of coarse grains, they are not abundantly consumed by the individuals. So, it become necessary to do the research to make people aware of benefits of coarse grains, to give them variety in their diet, to make their daily diet plan interesting and help them manage their weight.

## CEREAL AND PULSES-WEIGHT

Excessive weight is associated with series of health problems including diabetes, blood pressure and cardiovascular ailments (WHO 2002). Obesity or over weight is one of the complications associated with diabetes. Weight loss has beneficial effects on blood pressure, lipids and glucose control. Weight loss in the range of 5%-10% of initial weight that can confer significant improvements in these variables (Varma P et al 2016). Many studies have shown beta-glucans reduced body weight (Artiss JD et al 2006, Reynavillasmil et al 2007). In some studies, it was found that the individuals who consumed a greater amount of pulses as part of their usual diet had lower BMI (Megan A. et al 2010). However, very few studies have been conducted and only 1 considered beans separately from other pulses or legumes or from other food groups. Some trials have suggested that, greater dietary fiber consumption increases satiety and decreases caloric intake (Schroeder N et al 2009, Vitaglione P et al 2009, Vitaglione N et al 2010), which tends to weight loss. A diet high in protein and fiber-both found in barley has been shown to minimize overall daily calorie ingestion (Samra RA et al 2007, Weigle DS et al 2005). Habitual whole grain consumption seem to cause lower body weight by multiple mechanism, such as lower energy density of whole grain based products, lower glycemic index, fermentation of non-digestible carbohydrates (satiety signals) and finally by modulating intestinal micro flora (R. Giacco et al 2011). Pulses help in weight loss by second meal effect, by suppressing appetite in second meal with the condition that, the pulse should contain its husk intact. (Mollard RC et al 2014).

There are certain limitations of the study which could cause hindrance to the study. Those limitations are as given

- Patient not adhering to the diet for the prescribed time.
- Patient moves out of the place.
- Patient feasts many times during the test period.
- Patient pulls out of the work in the middle.
- Patient does not keep the records properly.
- Non availability of coarse grains (jawar, bajara) throughout the year.

## METHODOLOGY

For the purpose urban area of Bhopal (M.P) is taken as sample area. Then the area was divided into five zones i.e north, east, south, west and center. As the research work is experimental so the sample size taken was 30-30 so that statistics could be used to its best to verify the work, with 6-6 patients from each zone.

Sample Size:- The sample thus selected was divided into two groups:-

A-Control group

B-Experimental group

**Eligibility criteria of sample:-**The sample thus taken was supposed to be type II diabetic, resident of Bhopal's urban area because the study was on type II diabetic patients of urban area of Bhopal, also their lipid profile was also considered as one of the factor for the study to be chosen as sample.

**Locations where the data were collected:-** The required data was collected from Krishana diabetic clinic and research center near matamandir, Bhopal M.P (India)

**Sampling technique:-** The sampling method used to select the sample was purposive as specific type of sample was required for the research work. **Period:-** The sample was observed for the time period of 3-4 months for the required data. Everything was recorded at the prescribed time decided previously for the different attributes/variables. For this the sample of experimental was asked to consume 200-250gm of coarse grain (daliya, whole wheat atta, makkikaatta, oats, jawar, bajra, moong, urad, kidney beans, lentil, blackgram, etc). The improvement was tested on different variables after a period of 3-4 months. First reading was taken the time the sample was selected for the study, then the follow up was made regularly every month and then after 3<sup>rd</sup> month final reading was taken.

#### **TOOLS USED**

Different sort of tools were used to collect the required data for the proposed research work. Those tools are listed below.

(1) Anthropometric measurement:- Height(m)

Weight(kg)

(2) BMI

## RESULTS

Table 1

		Control Group			Difference in weight after 3 months			Experimental Group		
		Initial	Final	diff				Initial	Final	diff
Sex	Weight(Kg)	Weight(Kg)	diff	S.No	Sex	Weight(Kg)	Weight(Kg)	diff		
F	62	64.8	2.8		1 M	70.8	69.6	-1.2		
F	62.2	65.3	3.1		2 F	104.9	100	-4.9		
M	69.4	70.5	1.1		3 M	68	64.6	-3.4		
M	110	110	0		4 M	76.9	70	-6.9		
M	72.5	72.1	-0.4		5 M	62	62	0		
M	64	67.8	3.8		6 M	82	78.6	-3.4		
F	104.9	100	-4.9		7 F	98	96.9	-1.1		
M	70.8	71.4	0.6		8 F	60	56.1	-3.9		
F	48	48.8	0.8		9 M	72	70.5	-1.5		
M	84	83	-1		10 F	76	76.2	0.2		
F	90.4	90.4	0		11 M	75.7	72.4	-3.3		
M	128.4	128	-0.4		12 M	92.4	90	-2.4		
M	84	85.6	1.6		13 F	65.3	64.5	-0.8		
M	80	79.4	-0.6		14 F	72.3	70.9	-1.4		
F	60	69.5	9.5		15 M	69.3	70.2	0.9		
M	73	74.6	1.6		16 M	69.4	69.4	0		
M	83.5	84	0.5		17 M	69	71	2		
M	89	90	1		18 M	62	59.2	-2.8		
M	81.5	83.1	1.6		19 M	81.2	81	-0.2		
F	50.2	52.3	2.1		20 F	72	72.3	0.3		
F	53	54.6	1.6		21 M	69.5	70	0.5		
M	78.8	77	-1.8		22 M	75.8	74.4	-1.4		
M	76.7	77.7	1		23 M	94	87.9	-6.1		
M	71.4	72.3	0.9		24 M	126.5	119	-7.5		
F	89.4	88.6	-0.8		25 M	94.6	92.5	-2.1		
F	77.4	79.2	1.8		26 M	62.3	61.8	-0.5		
M	74.6	76	1.4		27 F	56.3	56.3	0		
M	53.9	53.9	0		28 F	51	52.4	1.4		
M	67.5	68.5	1		29 F	71.6	68.9	-2.7		
M	106.4	107.7	1.3		30 F	74.4	72	-2.4		
Avg	77.23	78.203333	0.973333			75.84	74.02	-1.82		

Table 2

		BMI chart of control and experimental group													
		Control Group					Experimental Group								
S.No	Sex	Initial reading		Final reading			S.No	Sex	Initial reading		Final reading				
		height(m)	Weight(Kg)	Height(m)	Weight(Kg)	BMI			height(m)	Weight(Kg)	Height(m)	Weight(Kg)	BMI		
1	F	1.67	62	22.23099	1.67	64.8	23.23497	1	M	1.69	70.8	24.78905	1.69	69.6	24.36889
2	F	1.62	62.2	23.70066	1.62	65.3	24.88188	2	F	1.66	104.9	38.06793	1.66	100	36.28974
3	M	1.65	69.4	25.49128	1.65	70.5	25.89532	3	M	1.7	68	23.52941	1.7	64.6	22.35294
4	M	1.8	110	33.95062	1.8	110	33.95062	4	M	1.67	76.9	27.5736	1.67	70	25.0995
5	M	1.64	72.5	26.95568	1.64	72.1	26.80696	5	M	1.77	62	19.78997	1.77	62	19.78997
6	M	1.68	64	22.67574	1.68	67.8	24.02211	6	M	1.7	82	28.3737	1.7	78.6	27.19723
7	F	1.66	104.9	38.06793	1.66	100	36.28974	7	F	1.57	98	39.75821	1.57	96.9	39.31194
8	M	1.76	70.8	22.8564	1.76	71.4	23.0501	8	F	1.6	60	23.4375	1.6	56.1	21.91406
9	F	1.53	48	20.50493	1.53	48.8	20.84668	9	M	1.73	72	24.05693	1.73	70.5	23.55575
10	M	1.7	84	29.06574	1.7	83	28.71972	10	F	1.57	76	30.83289	1.57	76.2	30.91403
11	F	1.53	90.4	38.61763	1.53	90.4	38.61763	11	M	1.7	75.7	26.19377	1.7	72.4	25.0519
12	M	1.79	128.4	40.07366	1.79	128	39.94882	12	M	1.66	92.4	33.53172	1.66	90	32.66076
13	M	1.7	84	29.06574	1.7	85.6	29.61938	13	F	1.6	65.3	25.50781	1.6	64.5	25.19531
14	M	1.75	80	26.12245	1.75	79.4	25.92653	14	F	1.549	72.3	30.13252	1.549	70.9	29.54904
15	F	1.43	60	29.34129	1.43	69.5	33.98699	15	M	1.65	69.3	25.45455	1.65	70.2	25.78512
16	M	1.67	73	26.17519	1.67	74.6	26.7489	16	M	1.75	69.4	22.66122	1.75	69.4	22.66122
17	M	1.77	83.5	26.65262	1.77	84	26.81222	17	M	1.64	69	25.65437	1.64	71	26.39798
18	M	1.65	89	32.69054	1.65	90	33.05785	18	M	1.56	62	25.47666	1.56	59.2	24.3261
19	M	1.73	81.5	27.23111	1.73	83.1	27.76571	19	M	1.78	81.2	25.62808	1.78	81	25.56495
20	F	1.56	50.2	20.62788	1.56	52.3	21.4908	20	F	1.56	72	29.5858	1.56	72.3	29.70907
21	F	1.46	53	24.86395	1.46	54.6	25.61456	21	M	1.62	69.5	26.48224	1.62	70	26.67276
22	M	1.66	78.8	28.59631	1.66	77	27.9431	22	M	1.7	75.8	26.22837	1.7	74.4	25.74394
23	M	1.76	76.7	24.76111	1.76	77.7	25.08394	23	M	1.65	94	34.52709	1.65	87.9	32.2865
24	M	1.68	71.4	25.29762	1.68	72.3	25.6165	24	M	1.79	126.5	39.48067	1.79	119	37.13991
25	F	1.51	89.4	39.20881	1.51	88.6	38.85794	25	M	1.74	94.6	31.24587	1.74	92.5	30.55225
26	F	1.57	77.4	31.40087	1.57	79.2	32.13112	26	M	1.65	62.3	22.88338	1.65	61.8	22.69972
27	M	1.73	74.6	24.92566	1.73	76	25.39943	27	F	1.5	56.3	25.02222	1.5	56.3	25.02222
28	M	1.62	53.9	20.53803	1.62	53.9	20.53803	28	F	1.47	51	23.60128	1.47	52.4	24.24916
29	M	1.72	67.5	22.81639	1.72	68.5	23.15441	29	F	1.5	71.6	31.82222	1.5	68.9	30.62222
30	M	1.83	106.4	31.77163	1.83	107.7	32.15981	30	F	1.574	74.4	30.03056	1.574	72	29.06184
Avg		77.23	27.87595		78.203333	28.27219			75.84	28.04532		74.02	27.39154		

## Weight chart

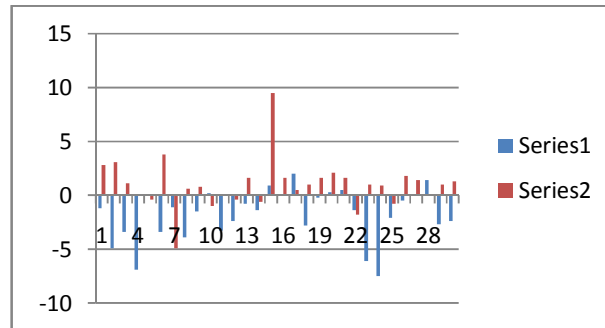


Figure 1

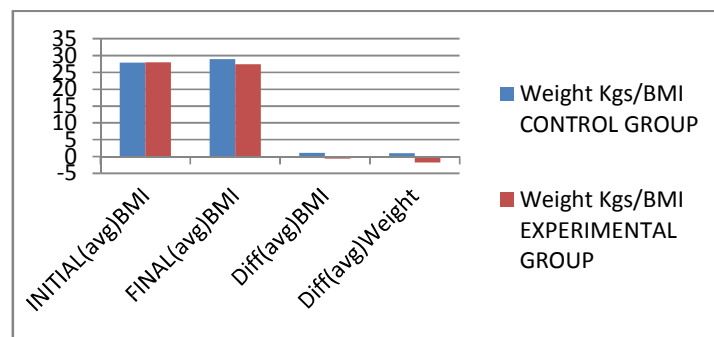
Series 1 is experimental group

Series 2 is control group

In the research, it was found that the average BMI of control group, after the time period of three months was 28.92 to initial of 27.87, and that of experimental group was 27.3 to initial of 28.041. So, significant improvement is seen in the BMI of type II diabetic patients of the experimental group.

Table 3:

	Weight Kgs/BMI	
	CONTROL GROUP	EXPERIMENTAL GROUP
INITIAL(avg)BMI	27.87	28.04
FINAL(avg)BMI	28.92	27.38
Diff(avg)BMI	1.054	-0.655
Diff(avg)Weight	0.97	-1.82



The average reduction of weight of experimental group is 1.82 Kgs, whereas, there is average weight gain of 0.97 Kgs is found in control group.

**Other effects of the study:-** There was no harmful effect of the study on the sample where as it had some beneficial effects as relieve in constipation, less time taken in morning ,long satiety .

**Generalization of the study:-** The result could be generalized for the whole Bhopal or M.Ps or on India's urban area as the sample taken represents whole Bhopal in best possible way.

## CONCLUSIONS

From the above finding, it could be concluded that the daily consumption of coarse grain by type II diabetic patient helps in reducing weight, and if the diet is accompanied by regular exercise, then the result would be better.

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