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Preparation of Weight Reducing Diet and its Biological and Clinical Evaluation

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Present studies were carried out for the preparation of weight reducing diet for obese people. Formulation of weight reducing diet is based on entirely local ingredients. It is cheaper than all other foods imported for this purpose. Clinical evaluation showed that average body weight reduction was 3 lbs $week^{-1}$ and it had no side effects like hypoglycaemia, hypokalaemia, hyponatraemia and hyperuricaemia.

Key words: Weight reduction, Low calorie diet, Soybeans.

Introduction

Obesity is the most common disorder of present time and gives rise to more ill-health. The general cause of obesity is an imbalance between energy intake and energy output and as a result, a large amount of fat accumulates in the body and around heart. It interferes with physical activity and efficiency of the heart in its contraction, resulting in the development of heart diseases, high blood pressure and also kidney diseases. Overweight people suffer from diabetes and other life shortening conditions earlier and are likely to die younger than people of normal weight.

In order to control the obesity, calorie intake is reduced below the total daily average requirement. Duncan *et al* (1963) reported that fasting may cause loss in weight and reduction in blood pressure to normal level. It has been stated (Cott 1977) that fasting brings a welcome physiological rest for the digestive tract and the central nervous system and is a better way to lose weight. The studies also described the unfavourable side effects, including hyperuricaemia, headache, electrolyte imbalance, severe ketosis, hypoglycaemia, hypokalaemia, hyponatraemia and mild weakness. To reduce the extra fat and body weight, reducing diet or increasing physical activity or combination of the both are generally considered simple and the best methods. In recent years, a number of diets have been developed which help in reducing the excess body weight. These diets cause a weight loss by reducing calorie intake and suppressing appetite. Some of them alter the metabolism in such a way that food energy is not absorbed and deposit as body fat. Monotony or boredom of the diet cause a reduction of calorie intake. Baird *et al* (1974) treated the obesity by diet and his studies revealed that patients, who were almost 30% overweight lost their weight by 1.8 kg $week^{-1}$. Serum uric acid level decreased, while serum electrolytes level remained stable.

As low calorie diets are not available to control the obesity, attempts have been made in the present investigations to prepare low calorie diet from indigenous raw materials which are economically feasible. Its biological and clinical evaluations has also been carried out. It is suitable for and above middle aged persons because during weight reduction period only light exercise such as walking is required and there is no need of taking up vigorous exercise. Our studies also show other beneficial effects of the diet. It tones up body muscles and increases sense of well being and self esteemed because of marked improvement in general appearance. Above all, the diet has no unfavourable side effects.

Materials and Methods

Raw materials for the preparation of diet were purchased from the local market. Soybean free from trypsin inhibitor was prepared as described earlier (Arshad *et al* 1980). The soft soybeans were then blended with hot water and slurry was passed through colloid mill. Skim milk, dextrin, dietary fibre and minerals were added to the slurry and cooked for 20 min in a steam jacketed pan. The cooked slurry was dried in thin flakes on a twin cylinder roller dryer at 40 lbs psi. The dried flakes were disintegrated and mixed with vitamins in such a quantity that 120 g of diet meet the daily recommended requirements of essential vitamins for adults (Anon 1968). The diet was mixed with flavouring ingredients to get three types of diet such as plain, vanilla and chocolate flavoured. The diet was sealed in polyethylene bags which contained 120 g of diet, a complete diet for an adult for 24 h. The detailed

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Table 1
Chemical analysis of diet

Moisture %	Protein %	Fat %	Ash %	Fibre %	Carbohydrates by difference %	Calories $100g^{-1}$	Total bacterial count g^{-1}	Coliform count g^{-1}
4.0	28.0	4.5	6.3	9.5	47.7	400	4800	Nil

description about the preparation of ingredients is not mentioned as the process rights of the recipe are to be patented.

Results and Discussion

Chemical analysis. The diet was analysed for moisture, proteins, fat, ash and crude fibre according to the AOAC methods (1984). Total bacterial count and coliform were determined according to the method of Mackie and McCarthey (1953). Calorific value was determined by means of a Bomb Calorimeter (SHIMADZU model-CA-4P). The results are given in Table 1.

The quantities of essential vitamins and minerals in the diet are given in Table 2.

Biological evaluation. Net protein utilization operative (NPU op) was determined according to the method of Miller *et al* (1955) using male albino rats weighing 30-35 g. Net dietary protein calories % (NDP cal %) were determined by the formula NDP cals% = NPU op x protein %. Protein efficiency ratio (PER) was determined at 10% protein level according to the method described earlier (Qureshi *et al* 1963) using weaning male albino rats. In addition to the test group, a reference standard group of rats on casein (BDH) diet at 10% protein level was maintained and PER was corrected by the factor:

$$\frac{2.5 \text{ (PER of Casein)}}{\text{Observed PER of Casein diet}}$$

The results are given in Table 3.

Clinical Evaluation. Obese men and women, having weight 30% above the average weight and age 40 ± 5 years were selected for clinical evaluation. Many volunteers, after few days/weeks of trial were reluctant to take diet for a long time. They discontinued as soon as they got their weight reduced to their desired level but they had not attained their normal weight. They could not restrict themselves to one diet. Monotony or boredom was the main cause for their discontinuation inspite of the fact that they were provided the diets containing different flavours, such as chocolate and vanilla. Anyhow, data of a few persons who continued the diet for two to three months was collected. They were advised to take 120 g of diet (i.e. by mixing about 35 g of diet with hot water) at 4 hourly interval, 4 times a day i.e. 24 h. Their body weight measurements were taken weekly and blood samples were collected fortnightly before breakfast in the morning (9-10 AM) to determine haemoglobin, sugar, urea, creatinine, total cholesterol, LDL and HDL cholesterol, triglycerides and total lipids.

Table 2
Essential vitamins and minerals of diet

Vitamins	Quantity
Vitamin A I.U $100\ g^{-1}$	5000
Vitamin D I.U $100\ g^{-1}$	400
Thiamin mg $100\ g^{-1}$	2.0
Riboflavin $100\ g^{-1}$	2.0
Niacin mg $100\ g^{-1}$	20.0
Vitamin C $100\ g^{-1}$	30.0
B_6 mg $100\ g^{-1}$	2.0
B_{12} ug $100\ g^{-1}$	5.0
Minerals	
Calcium mg $100\ g^{-1}$	800
Iron mg $100\ g^{-1}$	12.0
Sodium mg $100\ g^{-1}$	350.0
Potassium g $100\ g^{-1}$	220.0
Copper mg $100\ g^{-1}$	2.0
Zinc mg $100\ g^{-1}$	2.4
Manganese mg $100\ g^{-1}$	2.0
Iodine mg $100\ g^{-1}$	0.15

Table 3
Protein values of weight reducing diet

Diet	Protein cals (%)	NPU (op) (%)	NPU (std) (%)	NDP cals (%)	PER
Casein	10.0	60.0	65.6	6.0	2.5
Weight reducing diet at 10% protein	10.0	67.5	74.8	6.8	2.6

Tabel 4

Body weight loss (weekly) in 10 weeks experimental period

S. No.	Weeks 0	1	2	3	4	5	6	7	8	9	10	Total loss (lbs)	Average loss per week
1./F	184	178	175	172	170	169	166	163	159	155	152	32	3.2
2./F	184	179	177	173	172	165	167	164	159	156	154	30	3.0
3./F	184	181	176	172	169	166	163	161	158	156	154	30	3.0
4./F	189	186	182	180	177	173	169	166	161	159	157	32	3.2
5./F	190	186	182	178	175	173	170	167	165	162	159	31	3.1
6./F	192	188	184	179	177	174	172	169	167	160	158	33	3.3
7./F	205	196	193	191	188	185	182	179	176	174	173	32	3.2
8./F	207	205	202	198	196	196	192	188	183	179	177	30	3.0
9./F	208	204	200	195	192	189	187	184	181	178	175	33	3.3
10./F	210	207	204	204	200	197	194	190	187	184	180	30	3.0
11./M	230	226	223	220	217	214	211	208	205	201	198	32	3.2
12./M	238	237	233	231	229	224	220	216	212	209	206	32	3.2
13./M	243	241	236	234	230	228	222	219	218	216	212	31	3.1
14./M	250	245	241	238	235	231	229	225	222	219	216	34	3.4
15./M	250	245	241	237	234	231	227	225	221	218	215	35	3.5
16./M	250	245	242	238	234	231	228	225	221	219	217	33	3.3
17./M	252	246	241	237	235	233	228	226	223	220	218	32	3.2
18./M	255	250	247	244	241	233	235	231	227	223	219	36	3.6
19./M	257	253	250	248	246	243	241	238	235	231	226	31	3.1
20./M	262	256	250	246	242	237	233	229	226	224	220	42	4.2

Table 5

Blood sugar (mg 100 ml^{-1})

S. No.	Weeks 0	2	4	6	8	10
1./F	90.0	90.0	92.0	94.0	96.0	96.0
2./F	95.0	95.0	96.0	92.0	91.0	95.0
3./F	105.0	100.0	101.2	102.0	103.0	100.0
4./F	110.0	108.0	112.0	106.0	111.0	112.0
5./F	108.0	106.0	106.0	112.0	103.0	100.0
6./F	102.0	101.0	102.0	98.0	96.0	100.0
7./F	99.0	98.8	100.0	105.0	103.0	102.5
8./F	90.0	92.0	90.0	102.0	100.0	98.0
9./F	98.0	92.1	90.0	90.0	93.0	93.0
10./F	100.0	98.0	96.0	101.0	100.0	98.0
11./M	102.0	98.0	96.0	101.0	98.0	97.0
12./M	96.0	92.0	89.0	102.0	100.0	100.0
13./M	100.0	98.0	102.0	108.0	105.0	105.0
14./M	102.0	105.0	100.0	103.0	96.0	100.0
15./M	90.0	90.0	90.0	92.0	94.0	96.0
16./M	103.0	110.0	107.0	102.0	110.0	108.0
17./M	107.0	104.0	96.0	102.0	100.0	101.0
18./M	90.0	94.0	95.0	100.0	100.0	98.0
19./M	110.0	105.0	100.0	95.0	95.0	90.0
20./M	102.0	105.0	100.0	102.0	98.0	100.0

Table 6

Haemoglobin (g 100 ml^{-1})

S. No.	Weeks 0	2	4	6	8	10
1./F	15.4	15.5	15.1	15.5	15.0	15.8
2./F	14.8	14.8	15.0	14.9	15.2	15.1
3./F	14.6	14.8	14.7	14.9	15.0	15.0
4./F	14.2	14.4	14.5	14.9	15.0	15.0
5./F	13.6	13.6	14.0	14.2	14.0	14.8
6./F	14.9	14.6	15.1	15.2	15.1	15.2
7./F	12.9	13.8	14.2	14.0	14.1	14.0
8./F	14.0	13.9	14.1	14.2	14.1	14.4
9./F	14.4	15.8	15.9	14.9	15.0	15.0
10./F	12.9	13.2	13.9	14.1	14.2	14.2
11./M	15.1	14.8	15.4	15.6	15.8	15.8
12./M	14.3	14.7	14.8	15.0	15.2	15.2
13./M	14.2	14.6	15.0	14.8	14.6	14.8
14./M	15.0	15.2	15.3	15.0	15.7	15.6
15./M	13.2	13.6	14.1	14.0	14.2	14.3
16./M	14.3	14.8	15.0	15.1	15.1	15.3
17./M	15.0	14.7	14.7	14.9	15.4	15.4
18./M	13.8	14.1	14.8	14.8	14.9	15.0
19./M	15.6	15.9	16.2	15.6	15.8	16.5
20./M	14.5	14.7	14.9	15.0	15.1	15.0

Haemoglobin was estimated according to the method of Varley *et al* (1980) while blood sugar was determined according to the method of Asatoor and King (1954). Determinations of blood urea and creatinine were carried out according to the methods of Young *et al* (1972) and Bartels *et al* (1972) respectively. Total cholesterol was determined according to the method of Richmond (1973), HDL cholesterol was estimated according to the methods of Frie dwald (1973) and Gordon and Amer (1977). LDL cholesterol was estimated according to the method of Assman (1979). Estimation of total lipids and triglycerides were carried out according to the methods described by Sperry and Brand (1955) and Jacobs and Vandemark (1960) respectively. The results are given in Table 4-9. From Table 4, it was observed that rate of body weight loss in the initial weeks of the trial was fast and it gradually decreased with the decrease of body weight. The weight losses were 4 lbs week^{-1} in the initial weeks which decreased to 2 lbs week^{-1} in the last weeks in almost all the cases. It was also observed that rate of weight losses were more than 4 lbs week^{-1} of the persons having body weight 30% above the standard weight at the start of the trial such as the persons No. 15 to 20. It was deduced from the results that average body weight reduction was 3 lbs week^{-1} during 2 to 3 months of its feeding.

It was observed from Table 5 that there was no change in the blood sugar content of any person fed on the diet. It remained within the normal blood glucose level of an average healthy person (90-110 mg 100 ml^{-1}) during the trial period. None of them complained any sign of fatigue, headache and weakness, instead they felt they were more active and energetic prior to weight reducing period. It was deduced that the diet has no side effect like hypoglycaemia as usually appeared in other novelty diets based on a basic low-calorie plan. Similarly side effect like hypokalaemia and hyponatraemia were ruled out, because the daily intake of diet was hardly 120 g which contained daily recommended dose of potassium (K) and sodium (Na) for adults as shown in Table 2. It was observed from Table 3 that biological values such as net protein utilization, protein calories and protein efficiency ratio were similar to that of casein diet. Clinical analysis also revealed as in Table 6, that haemoglobin content of the persons was normal at the start of feeding trial and increased slightly at the end of 10 weeks in all cases, because the diet also contained required amount of iron salt. As a result, question of being enemic did not rise.

From Table 7, it was observed that total cholesterol values of almost all the men, at the start of trial, were above the average healthy person i.e. 240-298 mg 100 ml^{-1} which were reduced to 200-225 mg 100^{-1} ml generally during weight reducing period. The total cholesterol level of female volunteers was also above the average range i.e. 180-225 mg 100^{-1} ml before the weight reduction programme but rate of decrease was less as compared with that of male. There was also reduction in the content of LDL-cholesterol similar to that of total cholesterol but the change in HDL-cholesterol content was not appreciable and it was within the range of a normal healthy person

Table 7

Total cholesterol, LDL HDL -- cholesterol (mg 100 ml^{-1})

S. No.		Weeks 0	2	4	6	8	10
1/F	Total Cholesterol	248.0	242.0	238.0	224.0	222.0	200.0
	LDL "	98.0	93.0	89.0	85.0	78.0	73.0
	HDL "	90.0	90.2	89.1	88.1	87.2	87.0
2/F	Total Cholesterol	256.0	254.0	248.0	250.0	236.0	225.0
	LDL "	101.6	98.5	95.3	93.1	91.2	90.0
	HDL "	47.1	47.0	46.8	48.1	50.0	51.4
3/F	Total Cholesterol	237.0	239.0	240.0	235.0	233.0	232.0
	LDL "	95.0	93.0	92.3	91.2	88.1	86.0
	HDL "	84.0	84.1	84.3	84.7	85.0	85.0
4/F	Total Cholesterol	248.0	248.0	248.0	245.0	241.0	240.0
	LDL "	98.8	98.0	95.0	95.2	93.0	91.0
	HDL "	40.0	40.8	43.0	43.4	44.0	44.0
5/F	Total Cholesterol	257.0	242.0	238.0	231.0	228.0	222.0
	LDL "	115.0	102.0	99.0	95.0	92.0	93.0
	HDL "	40.0	40.6	41.1	41.3	41.7	42.0

(Cont'd...)

(Table 7 cont'd...)

6/F	Total Cholesterol	265.0	245.0	238.0	236.0	231.0	225.0
	LDL "	110.0	106.0	102.0	96.0	87.0	85.0
	HDL "	45.0	44.7	44.5	44.6	44.1	44.0
7/F	Total Cholesterol	269.0	254.0	248.0	239.0	232.0	230.0
	LDL "	105.0	98.0	94.0	90.8	91.0	91.0
	HDL "	48.0	47.1	46.8	46.2	46.2	46.0
8/F	Total Cholesterol	241.0	240.0	238.0	236.0	229.0	221.0
	LDL "	98.0	95.0	93.0	87.0	85.0	82.0
	HD	40.0	41.0	40.8	41.6	42.5	43.0
9/F	Total Cholesterol	255.0	246.0	238.0	231.0	225.0	223.0
	LDL "	103.0	100.0	99.0	95.0	88.0	81.6
	HDL "	63.2	62.6	62.6	62.8	63.0	63.0
10/F	Total Cholesterol	248.0	243.0	239.0	228.0	219.0	211.0
	LDL "	98.0	92.2	87.6	82.3	80.0	78.0
	HDL "	80.0	80.6	82.1	84.7	84.3	84.0
11/M	Total Cholesterol	250.0	245.0	238.0	229.0	221.0	218.0
	LDL "	115.0	114.0	105.0	106.0	107.0	105.0
	HDL "	75.0	75.4	76.1	76.8	77.1	78.0
12/M	Total Cholesterol	243.0	244.0	236.0	231.0	229.0	227.0
	LDL "	96.0	98.0	94.0	90.0	88.0	85.0
	HDL "	85.0	84.8	84.3	84.6	84.1	84.0
13/M	Total Cholesterol	273.0	269.0	260.0	252.0	238.0	223.0
	LDL "	98.0	95.8	93.0	88.0	85.4	85.0
	HDL "	42.0	42.2	42.6	43.0	43.2	43.5
14/M	Total Cholesterol	240.0	232.0	228.0	221.0	215.0	202.0
	LDL "	118.0	110.0	103.0	95.0	92.0	90.0
	HDL "	80.0	80.6	81.7	80.0	79.7	--
15/M	Total Cholesterol	295.0	290.0	281.0	267.0	235.0	215.0
	LDL "	106.0	102.0	99.2	96.6	92.4	84.4
	HDL "	50.7	52.0	52.5	52.8	53.0	53.5
16/M	Total Cholesterol	270.0	263.0	258.0	247.0	236.0	225.0
	LDL "	116.0	103.6	99.8	95.1	93.2	91.0
	HDL "	45.0	45.2	45.7	46.2	46.8	47.0
17/M	Total Cholesterol	248.0	241.0	232.0	225.0	219.0	214.0
	LDL "	95.0	97.2	94.0	83.0	81.0	78.0
	HDL "	75.0	74.7	73.2	73.0	72.5	72.0
18/M	Total Choleserol	298.0	286.0	274.0	261.0	250.0	235.0
	LDL "	118.0	109.0	101.0	95.0	95.0	95.1
	HDL "	42.0	43.5	43.6	44.1	44.6	45.0
19/M	Total Cholesterol	268.0	254.0	248.0	237.0	231.0	230.0
	LDL "	105.0	102.0	99.3	98.5	93.2	92.0
	HDL "	61.0	61.8	61.3	61.1	60.9	61.0
20/M	Total Cholesterol	281.0	277.0	261.0	255.0	248.0	244.0
	LDL "	110.0	104.0	98.0	93.0	87.0	82.0
	HDL "	45.3	47.1	46.9	47.8	48.3	49.0

Table 8

Triglycerides and total lipids (mg 100 ml^{-1})

S. No.		Weeks 0	2	4	6	8	10
1/F	Triglycerides	185.0	172.3	155.5	152.0	150.0	146.0
	Total lipids	990.3	942.5	921.0	912.0	900.0	870.0
2/F	Triglycerides	198.0	193.6	189.2	178.1	177.0	162.0
	Total lipids	1000.0	996.1	981.1	976.8	967.0	955.2
3/F	Triglycerides	210.0	190.0	170.0	172.0	163.0	155.0
	Total lipids	1193.5	1150.0	1090.5	1010.0	992.0	990.0
4/F	Triglycerides	203.8	196.2	188.5	172.0	170.0	168.0
	Total lipids	1048.0	1033.0	1014.0	996.0	982.0	965.0
5/F	Triglycerides	170.0	158.0	160.0	155.0	152.0	150.0
	Total lipids	998.0	983.0	972.0	970.0	963.0	960.0
6/F	Triglycerides	189.0	176.0	173.2	168.0	157.0	151.0
	Total lipids	992.0	981.0	975.0	963.0	955.0	942.0
7/F	Triglycerides	198.0	171.0	167.0	165.0	158.0	150.0
	Total lipids	1139.0	1102.0	1060.0	1022.0	1000.0	1000.0
8/F	Triglycerides	201.0	198.0	182.0	173.0	166.0	155.0
	Total lipids	1082.0	1072.0	1063.0	1052.0	1046.0	938.0
9/F	Triglycerides	208.0	190.0	178.0	171.0	162.0	154.0
	Total lipids	1115.0	1104.0	1068.0	1031.0	1012.0	1000.0
10/F	Triglycerides	188.0	176.0	171.0	165.0	161.0	158.0
	Total lipids	1011.0	991.0	992.0	980.0	979.2	958.0
11/M	Triglycerides	182.0	174.0	178.0	171.0	162.0	154.0
	Total lipids	1082.0	1104.0	1068.0	1031.0	1012.0	1000.0
12/M	Triglycerides	198.6	191.2	180.0	171.3	165.0	151.9
	Total lipids	1012.0	992.0	969.3	957.0	940.0	936.0
13/M	Triglycerides	200.0	190.0	181.0	172.0	165.0	158.0
	Total lipids	1000.0	991.0	984.0	949.0	941.0	941.0
14/M	Triglycerides	190.0	178.0	169.2	157.0	156.0	151.0
	Total lipids	1018.0	997.5	982.0	969.0	958.0	941.8
15/M	Triglycerides	185.0	178.0	172.3	155.5	150.1	146.0
	Total lipids	990.3	960.0	942.5	921.0	900.0	870.0
16/M	Triglycerides	215.0	193.7	181.0	172.0	162.0	155.0
	Total lipids	1092.0	1080.0	1048.0	1027.0	991.0	970.0
17/M	Triglycerides	191.0	182.0	176.0	172.0	158.0	155.0
	Total lipids	962.0	957.0	951.0	942.0	918.0	916.0
18/M	Triglycerides	185.0	171.0	168.0	154.0	150.0	143.7
	Total lipids	972.0	948.0	922.0	892.0	881.0	868.0
19/M	Triglycerides	210.0	208.0	200.0	186.0	168.0	150.0
	Total lipids	1100.0	1038.0	1060.0	1020.0	988.4	976.6
20/M	Triglycerides	196.0	184.0	172.0	168.5	156.0	148.0
	Total lipids	1005.0	979.3	980.2	951.0	929.0	892.0

Table 9

Blood urea and creatinine (mg 100 ml^{-1})

S. No.		Weeks					
		0	2	4	6	8	10
1/F	Urea	37.0	35.2	36.0	35.1	35.0	36.0
	Creatinine	1.0	0.92	0.92	0.92	0.90	0.86
2/F	Urea	35.0	35.3	35.1	35.6	35.4	35.8
	Creatinine	1.0	0.95	0.98	1.0	0.95	1.0
3/F	Urea	31.5	30.8	31.2	31.6	30.3	31.0
	Creatinine	1.0	1.1	1.0	1.0	1.1	1.0
4/F	Urea	30.0	30.3	30.8	30.1	31.0	31.2
	Creatinine	1.0	1.1	1.0	1.0	1.1	1.1
5/F	Urea	30.1	30.0	29.8	31.2	31.8	31.9
	Creatinine	1.1	1.0	1.1	1.2	1.1	1.0
6/F	Urea	32.0	32.2	32.1	31.6	31.2	31.8
	Creatinine	1.0	1.1	1.1	0.98	1.1	1.1
7/F	Urea	30.0	30.3	30.8	30.1	31.0	31.2
	Creatinine	1.0	1.1	1.0	1.0	1.1	1.1
8/F	Urea	31.2	30.8	30.6	31.0	30.7	31.0
	Creatinine	1.1	1.0	0.95	1.1	1.0	1.0
9/F	Urea	31.8	31.9	30.6	31.5	31.4	31.6
	Creatinine	1.0	1.0	0.92	1.0	1.1	1.0
10/F	Urea	32.0	31.6	30.8	30.7	31.0	31.5
	Creatinine	1.0	1.1	1.0	0.95	1.0	1.1
11/M	Urea	35.0	35.6	35.2	36.0	35.8	35.8
	Creatinine	1.0	0.96	0.92	1.0	0.94	0.92
12/M	Urea	36.0	35.6	32.0	31.8	32.0	32.8
	Creatinine	1.2	1.1	1.0	0.95	1.0	1.0
13/M	Urea	37.0	36.8	35.2	36.0	36.2	36.5
	Creatinine	1.0	0.94	1.0	1.1	1.0	1.0
14/M	Urea	31.8	31.2	30.8	30.2	30.6	30.7
	Creatinine	0.90	0.88	0.86	0.90	0.98	1.0
15/M	Urea	35.0	35.6	35.2	36.0	35.8	35.8
	Creatinine	1.0	0.96	0.92	1.0	0.94	0.92
16/M	Urea	32.0	31.8	30.9	31.6	30.8	31.0
	Creatinine	1.0	1.0	0.95	1.0	0.98	1.0
17/M	Urea	31.0	28.0	30.1	30.5	29.2	30.0
	Creatinine	0.85	0.92	1.0	1.1	0.98	0.92
18/M	Urea	33.0	32.6	31.6	30.8	30.2	30.0
	Creatinine	1.1	1.1	1.0	1.1	1.0	1.0
19/M	Urea	39.2	39.0	39.0	38.6	38.0	38.0
	Creatinine	1.1	0.97	1.0	0.95	0.86	0.82
20/M	Urea	30.2	30.8	30.5	31.0	30.6	31.0
	Creatinine	0.88	0.9	0.9	1.0	0.95	1.0

at the start of the programme. In other words, it was concluded that weight reducing diet helped in brining down the upper limit of the total cholesterol and LDL-cholesterol to the normal range.

There was marked improvement in serum triglycerides and total lipid levels, as it was observed from Table 8. The persons who were having these values above the normal range and were leading towards the range of hypertension stage, were restricted to the normal stage. These values of blood of all the volunteers were decreased gradually and eventually they reached the normal values. It was observed from Table 9 that percentage urea and creatinine in the blood of all the volunteers remained unchanged, throughout the trial period of 10 weeks. No doubt that diet contained high percentage of proteins but did not contain any ingredient like meat having purines compounds. As a result, it was deduced that overweight persons, suffering from hyperuracaemia and gout can reduce their excess weight with the help of this diet, thereby reducing excessive burden on the body joints.

The weight reducing programme should be followed by a maintenance programme that allows a person to eat his favourite foods in such a manner that food should contain calories between 1500-2000 per day depending upon their nature of work. Besides this, calories from fat, carbohydrate and protein of the food for such persons should be approximately in the ratio 1: 4: 3 respectively. The daily food intake should contain the daily recommended quantity of vitamins and minerals.

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