

## **Dietary Profiles of 30 to 50 Year Females of Punjab**

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### **Abstract**

The results of the present study conducted on 400 females indicate that females especially after the middle age consume greater calories in their daily diets both total as well as in relation to their body weight and also exceed the recommended values. In addition to this the dietary composition reveals greater fat consumption as well as protein in their daily diets. The energy expenditure profiles point to positive energy balance in these group of females. All these factors are indicative of a negative life style lead by them and increase the risk of obesity and other related diseases. It is therefore felt necessary to sound the health planners regarding all these facts. Preventive measures in this regard are necessitated. These include the ingestion of healthful diets containing optimal amounts of various nutrients both major and minor as well as increase in the physical activity in their daily life.

Key Words: **Carbohydrates, Proteins, Fats, Fibres, Cholesterol, RDA**

### **Introduction:**

Today as a result of applications of Science & Technology many significantly change in our food supply and thus food consumption have occurred. There are new varieties of edible plants, large-scale methods of agriculture and animal husbandry, rapid mean of transporting food over long distances and large scale processing and storage methods for preservation of food. The food we eat is grown and prepared away from home; with the result the agribusiness and food processing industry exert much control over the food supply. Effect of these changes in the nutritional status is visualized to be both positive and negative. Seasonal foods are available throughout the year and perishable items last longer. Nutritional quality definitely depends on all the factors [Stafford, 1979 and Arnold & Roberts, 1982]. In addition to this faster life in urban areas has forced the people to go for the fast food, thus leading to major nutritional

drawback in their eating behavior, which include lack of variety, high calcium density, high sugar contents, high proportion of saturated fat, high sodium contents and preponderance of refined foods and lack of food sources of fibers.

In India a number of surveys conducted on diets consumption revealed that majority of population depends on cereal based diet. Because cereals being the cheapest source of calories contributed 70 – 80 percent of the total calories in diet [Gopalan *et al* 1985 and Rao *et al* 1986]. The consumption pattern in Andhra Pradesh was studied by Pushpamma *et al* [1984] who reported that the average intake of fruits and vegetables was below the recommended level because fruits were taken occasionally in that state.

Hira *et al* [1991] conducted a study on 160 farming families from 8 villages of Ludhiana district of age group 30 – 60 years. The results showed that the energy consumption was low in landless (no land) low-income group (0-5 acres) and middle-

income group (5-10 acres) but not in case of high-income group (above 10 acres). The protein intake was more than the RDA in all the groups. A number of other investigators have reported a linkage between the energy consumption and socioeconomic status of the subjects [Hanumantha Rao, 1976; Aujla et al, 1983; Rao et al, 1986; Rao, 1987; Kang, 1990 and Nayga, 1994].

In general, it can be said from the above reviewed studies that deviations are reported in the daily dietary intake from the normally recommended dietary allowances in Indian females. There is a need to interpret these findings in the light of functional changes with age in females as well as changes in their lifestyle and the social environment. This is important for the middle-aged segment of females who are facing the ageing effects. The dietary survey studies thus assume significance especially when it is well known that physical activities and a good diet can reverse the process of ageing to a significant degree [Evans and Rosenberg, 1991].

Keeping in view the above, the present investigation has been planned to study the dietary intake and energy expenditure profiles of middle-aged women belonging to 30-50 years age group with the following aims and objectives.

1. To report daily dietary intake of nutrients by the females from age 30-50 years.
2. To study the daily energy expenditure profiles in women from 30-50 years of age.

**Materials and Methods:**

The present study was conducted on 400 sedentary women ranging in age

from 30 to 50 years of age and belonging to urban areas of main cities of Punjab like Ludhiana, Patiala and Amritsar, where the impact of mechanisation is likely to be very great on physical activity and nutritional habits of the population. To study the changes in the dietary profiles and energy expenditure profiles through middle age in the females, the subjects have been divided into four, 5 yearly age groups as under:

Age Group (Years)	No of subjects (N)	Age range (Years)	Mean Decimal Age (Years)
30-35	100	30.00 - 35.00	32.39
35-40	100	36.00 - 40.00	38.43
40-45	100	41-00 - 45.00	43.22
45-50	100	46.00 - 50.00	48.46

Three days consecutive dietary record of each subject was taken and fed into the computer for dietary analysis of food for composition of its nutrients with the help of Dine Healthy software.

**Results & Discussion:**

**Daily Energy Intake:**

**Table 1: Mean values of daily energy intake and expenditure**

		Energy Intake Cal	Energy Expenditure Cal
<b>Group – I</b> (30-35 Yr)	Mean	1911	2049
	± S.D.	±182	±229
<b>Group – II</b> (35-40 Yr)	Mean	1943	2067
	± S.D.	± 128	± 163
<b>Group – III</b> (40-45 Yr)	Mean	2057	2005
	± S.D.	± 117	± 153
<b>Group – IV</b> (45-50 Yr)	Mean	2118	1923
	± S.D.	± 111	± 189

Average daily energy intake has been observed to increase with increase in

age. Group – I (30 – 35 year) females on an average consume 1911 Cal in their daily diet that increase to 2118 Cal in the age Group – IV (45 - 50 year), thus demonstrate an increase of 10.8% (Table 1).

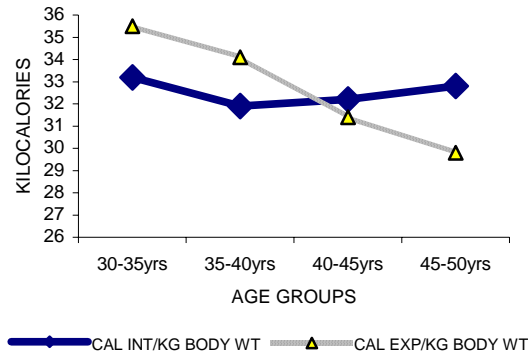


Figure 1: Average caloric intake and expenditure of females in relation to body weight in different age groups

In statistical terms, significant differences can be noticed in the daily energy intake among the various age groups (Table 8). On expressing the daily energy intake in relation to body weight of the females, a general trend of slow decrease is observed with increase in age (Figure 1). As per the NIN recommendations for Indian women, the daily energy intake by the females between 30 to 40 years has been found to be in agreement but beyond 40 years the present group of females exhibit 10 to 13% higher calorie intake in their daily diets. Mean daily energy intake values observed in the present study compares with the findings of some earlier investigators on Punjabi women. [Ahluwalia, 1981; Puri et al, 1983; Kaur, 1992; Chadha,, 1996 & Mann et al, 1997].

**Daily Energy Expenditure:**

Comparable mean values of daily energy expenditure are observed in the females belonging to the first two age groups. After the age of 40, the total daily

energy expenditure is observed to decrease with increase in age in the present study. Statistically significant differences are recorded among the various age groups in this parameter (Table 8). After accounting for the increase in body weight by expressing the daily energy expenditure per kg body weight of the subjects, a gradual decrease in energy expenditure with the increase in age is observed (Figure 1). It is interesting to observe that females in the first two age groups spend more calories in relation to their body weight than what they consume. In the subsequent age groups i.e. 40 to 45 and 45 to 50 years, the opposite is found to be the case. This means that after the age of 40 years the females tend to have a positive energy balance which if maintained for a long period can lead to further weight gain in them.

Stamler [1993] reported that high daily energy intake is a major factor in the development of obesity in western societies. Many researchers have confirmed in their studies that if the daily diet contain high amount of dietary fat, tendency to gain weight develops more easily [George et al, 1990; Kendall et al, 1991; Scotellaro et al, 1991; Sheppard et al, 1991; Tremblay et al, 1991; Thomas et al, 1992; Hill et al, 1992; Klesges et al, 1992; Tucker & Kano, 1992; Gazzaniga & Burns, 1993 & Lawton et al, 1993]. However they further report that when the intake of carbohydrates and fiber is high, it is easier to lose body weight.

**Dietary Intake Profiles of Females Grouped By Age**

The daily dietary intake of total fat by 30 – 35 year females is found to be 69.43gms and increase to 86.12gms/day in 45 to 50 year females. In terms of percentage, the increase calculates to 24%. An analysis of the breakup of total fat consumed in terms

of its saturated and unsaturated fat components, reveal that saturated fat component consumed by the females belonging to various age groups constitute 33 to 38% of the total fat. The rest of the fat consumed by the females is found to be in the form of Mono and Polyunsaturated fats. A similar analysis of the dietary intake of fat of the females belonging to the present study has been done for the animal and plant fat components. The results reveal that younger females (30 to 35 years age group) consume animal and plant fat almost in equal proportion but with increase in age, a general trend of increase in the consumption of fat derived from animal sources is demonstrated by the females (Figure 2).

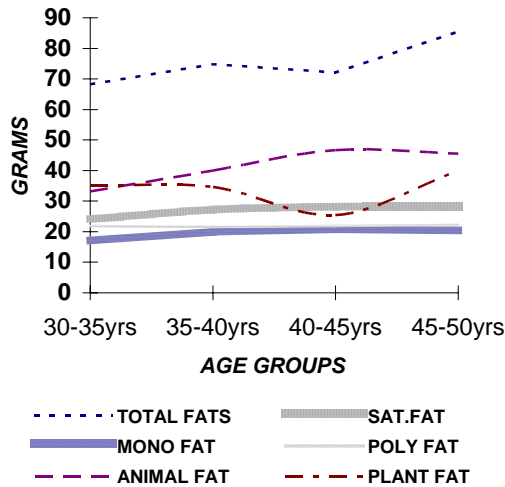


Figure 2: Average consumption of various components of fat by different age groups

Table 2: Daily dietary intake of fats among females belonging to different age groups

	(30-35 Yr)	(35-40 Yr)	(40-45 Yr)	(45-50 Yr)
	Mean ±S.D.	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.
Tot Fats (gm)	69.43 ± 7.59	77.00 ± 6.45	74.49 ± 6.88	86.12 ± 7.13

<b>Saturated Fats</b>	24.78 ± 4.22	28.12 ± 3.99	28.99 ± 4.11	28.67 ± 4.46
<b>Monounsaturated Fats</b>	17.47 ± 2.08	20.70 ± 2.66	21.18 ± 2.90	20.98 ± 2.89
<b>Polyunsaturated Fats</b>	21.96 ± 3.34	22.02 ± 2.67	22.56 ± 2.87	22.75 ± 2.72
<b>Animal Fats</b>	34.54 ± 6.48	41.05 ± 5.66	48.13 ± 6.90	45.59 ± 6.94
<b>Plant Fats</b>	34.89 ± 4.69	35.94 ± 5.19	26.35 ± 5.53	40.53 ± 5.08
<b>Cholesterol (mg)</b>	122.85 ± 30.71	148.97 ± 23.81	152.75 ± 22.67	151.77 ± 23.70

As far as the plant fat is concerned, its average remains the same for the 35 – 40 years age group and with further increase in the age, the consumption of this component of fat decrease in the 40 – 45 years age group, followed by an increase again to an average value 45.59gms/day in the last age group. In general, the consumption of animal fats by females from 30 to 35 years remains higher than the daily plant fat consumed by them. (Table 2 and Figure 2)

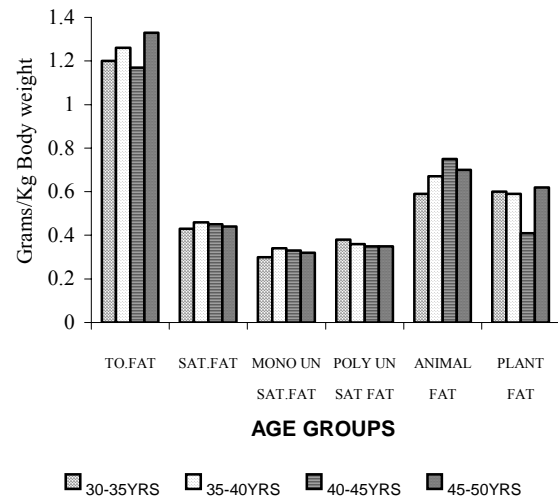


Figure 3: Comparison of consumption of total fat and its components among females

To account for the increase in body weight from age 30 to 50 years, the total fat consumed per day as well as the dietary

consumption of the various components of fat has been expressed in relation to the body weight of the subjects. (Figure. 3) In spite of the fact that the total fat and one of its components i.e. animal fat has been expressed in relation to the body weight of females, an increase in both is witnessed with increase in age. As far as the other components are concerned, their weight expressions reveal comparable average values in the different age groups.

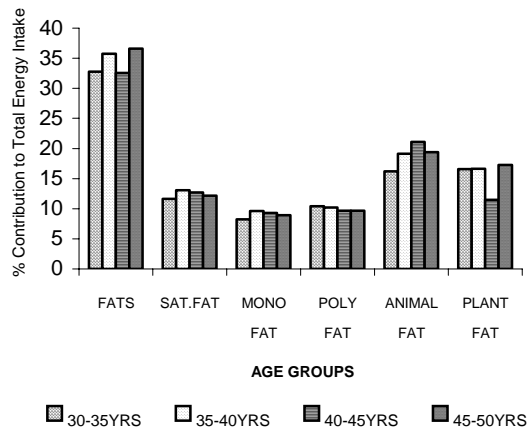
**Table 3: Percentage contribution of daily dietary intake of fats to total energy intake**

	(30-35 Yr)	(35-40 Yr)	(40-45 Yr)	(45-50 Yr)
	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.
<b>Tot Fats (gm)</b>	32.80 ± 3.37	35.75 ± 2.98	32.57 ± 2.15	36.60 ± 2.27
<b>Saturated Fats</b>	11.64 ± 1.48	13.09 ± 2.13	12.69 ± 1.68	12.19 ± 1.79
<b>Monounsaturated Fats</b>	8.22 ± 0.84	9.61 ± 1.26	9.27 ± 1.22	8.92 ± 1.22
<b>Polyunsaturated Fats</b>	10.42 ± 1.97	10.21 ± 1.12	9.87 ± 1.19	9.68 ± 1.14
<b>Animal Fats</b>	16.21 ± 2.31	19.11 ± 3.15	21.07 ± 2.85	19.37 ± 2.74
<b>Plant Fats</b>	16.58 ± 2.91	16.63 ± 1.98	11.50 ± 2.22	17.25 ± 1.96

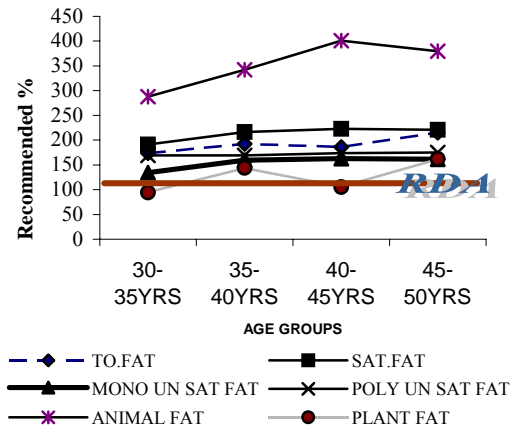
Fats are known to be the most concentrated source of energy and are responsible for various important functions in the body, which include insulation, cushioning and absorption of fat-soluble vitamins. The contribution by the total fat and its various components to the total energy has been calculated and average values along with the related statistical information are given in Table 3,9&10. The average contribution of total fat towards the total energy intake has been observed to increase with increase in age of females. Group - I females on an average are observed to derive 32.8% energy from total daily dietary fats. This value increases with

age to the extent that females belonging to 45 to 50 years age group derive 36.6% energy from fats. The energy derived from the daily dietary consumption of saturated fats has been found to be 11.64%, 13.09%, 12.69% and 12.19% in groups I, II, III & IV respectively (Figure 4).

Health experts recommend that fat energy should not exceed 25 to 30% of the total Calories, with no more than 7 to 10% of that coming from saturated fat. The results pertaining to the present study indicate that on an average the females of the present study in all the age groups consume a far greater amount of fats in their diet (Figure 5).



**Figure 4: Percent contribution of total fat & its various components to total energy intake**



**Figure 5: Dietary fat intake expressed as percent of RDA**

High fat diet has been shown to be associated with weight gain [Prewitt *et al*, 1991]. A clear trend of increase in fat intake by the females with increase in age makes them more vulnerable to weight gain. Moreover, the high quantity of fat in the diet is also reported to be linked with a number of diseases like High Blood Pressure, Coronary Heart Disease, Diabetes, and Cancer etc. Controlling the amount of saturated fats in the diet is the most important diet related action required to be taken to limit the levels of cholesterol. In blood, elevated levels of cholesterol are associated with increased risk of premature heart disease. As a preventive measure it is strongly suggested that these females should minimize their saturated fat intake. This is especially true for those who have high blood cholesterol levels i.e. more than 200mg/100ml of blood.

In the present investigation, the dietary intake of cholesterol among the various age groups of females has also been evaluated. The intake of dietary cholesterol has been found to range between 122.85mg to 152.75mg in the various age groups (Table 2). Health experts suggest daily dietary cholesterol consumption of less than 300mg/day. As per this guideline the females of the present study consume less cholesterol in their diets. *Sempos et al*, [1993] have reported 450mg/day dietary cholesterol in the U.S. population. Cholesterol is an essential metabolite and actively synthesized by human body in an amount equal to 800 to 1500mg daily. In contrast to many species, man absorbs cholesterol poorly; permitting the entry of only 10 to 50 percent of that in the diet. According to *Giles et al* [1993], there is a curvilinear relationship between dietary cholesterol and serum cholesterol

concentration in man. He further showed that the modification of diet with respect to the level of fat, kind of fat and amount of dietary cholesterol could cause the alteration in serum lipid and lipoprotein concentration in humans. According to him, a high intake of saturated fat is a major factor in elevating serum cholesterol and low-density lipoproteins (LDL) levels. He further demonstrated that a high intake of polyunsaturated fat is important in the lowering of serum cholesterol levels. *Connor et al* [1978] also hold the view that saturated fats, polyunsaturated fat and cholesterol in the diets can affect serum cholesterol concentrations.

*American Heart Association* (1988) has recommended that dietary lipids should be reduced to less than 30 percent of calories and that the ratio of polyunsaturated to saturated fat (P: S) be changed to a ratio of about 1.0 in order to achieve lower cholesterol levels in the population. The P: S ratio has been calculated in the different age groups of females in the present study to assess them as per the above guidelines. It is heartening to know that this ratio is quite close to the recommended value of 1.0. Females of the present study in general, consume polyunsaturated fats and saturated fats in the ratio of 0.78, which is very close to one and is much higher than the value of 0.4 reported on American population. There is still a scope of further improvement in the consumption of dietary fats so that the P: S ratio of 1.0 could be achieved on female population of Punjab, so as to keep them free from the risk of arteriosclerosis.

#### **Daily Dietary Intake of Carbohydrates:**

Average total carbohydrates consumed in the diet by group - I (30 - 35 years) are found to be 273.83gms and with increase in age of the subjects no trend of

either increase or decrease is witnessed (Table 4 & Figure 6). However when the total carbohydrates taken in the diet by the females belonging to various age groups are expressed in relation to their respective body weights, a general trend of decline is seen (Figure 7).

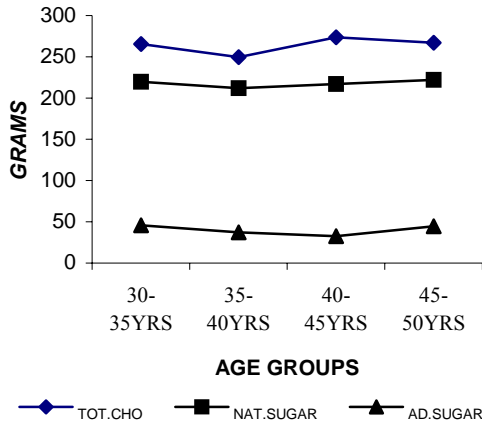


Figure 6: Average consumption of different components of carbohydrates

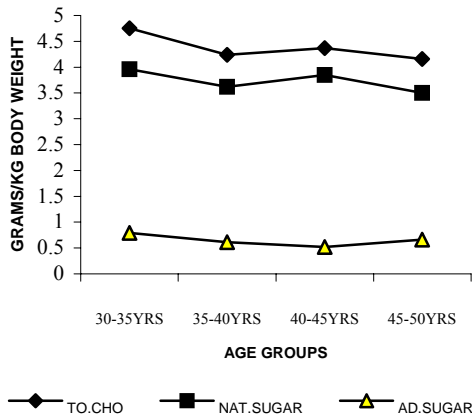


Figure 7: Average consumption of different components of carbohydrates/kg body wt

Table 4: Mean values of daily dietary intake of carbohydrates

	(30-35 Yr)	(35-40 Yr)	(40-45 Yr)	(45-50 Yr)
Mean	Mean	Mean	Mean	Mean
±S.D.	± S.D.	± S.D.	± S.D.	± S.D.
<b>Tot</b>	273.83	257.75	279.45	268.62

<b>Carbohyd</b>	± 35.80	±28.07	±23.20	± 0.81
<b>Net Sugar</b>	228.13	220.29	245.96	225.81
	± 32.60	±26.15	±21.70	±20.12
<b>Added Sugar</b>	45.69	37.46	33.48	42.81
	± 13.38	±10.73	±12.38	±10.58
<b>Dietary Fibre</b>	31.98	36.69	37.98	67.01
	± 6.17	± 4.99	± 5.20	± 7.81

Table 5: Percentage contribution of dietary carbohydrates to total energy intake

	(30-35 Yr)	(35-40 Yr)	(40-45 Yr)	(45-50 Yr)
	Mean ±S.D.	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.
<b>Total Carbohyd</b>	57.25	52.93	54.32	50.57
	± 4.74	± 3.78	± 3.05	± 2.52
<b>Net Sugar</b>	47.61	45.22	47.80	42.65
	± 4.04	± 4.00	± 2.96	± 2.61
<b>Added Sugar</b>	9.64	7.70	6.51	8.12
	± 2.81	± 2.17	± 2.47	± 2.05

Group - I females, on an average, are found to derive approximately 57% of their energy from carbohydrates while a similar contribution in case 35 - 40, 40 - 45 and 45 - 50 year age groups calculated to 52%, 54% and 50% respectively (Table 5 & Figure 8).

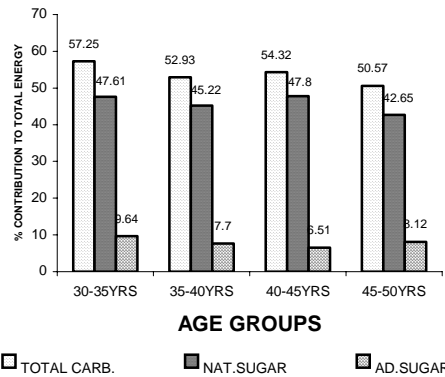


Figure 8: Percent contribution of carbohydrates and its components to total energy intake

The consumption of various components of carbohydrates taken in the

diet by females of the present study has also been analyzed. In general, females consume in their daily diet higher amounts of natural sugar as compared to the added sugar (Figure 8 & Table 11, 12). Group – I subjects consumed natural sugar and added sugars in the ratio of 5:1 and this ratio increases in group – II and group – III subjects to 5.9:1 and 7.4:1 respectively. In the group - IV subjects, the ratio declines to 5.3:1 in the females. Natural sugar consumption in general, is found to be comparable among different age groups. In terms of RDA (Recommended Dietary Allowances) for carbohydrates as per American Guidelines (Dine Healthy System) the consumption of total carbohydrates has been found to be normal. Natural sugar consumption on the other hand is found to fall short of RDA as per Dine Healthy System in all the age groups except 40 to 45 years age group Figure 9). The consumption of natural sugar however is found to far exceed the recommended values in all the age groups.

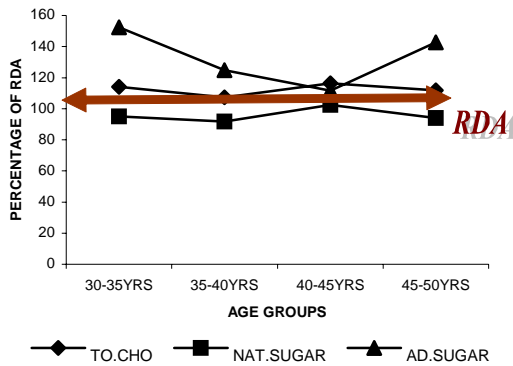


Figure. 9: Dietary intake of carbohydrates expressed as percent of RDA

As far as the added sugar consumption is concerned, less than 10 % of the caloric intake is due to the added sugar in the diet, which is within the normal range of up to 10 % recommended [Lank, 2000]. This is a healthy trend

observed in the dietary analysis pertaining to the present study, as sugar provides nothing but empty calories and tend to crowd other nutrients out of the diet. More so, it promotes tooth decay and can contribute to weight gain.

Dietary fiber consumption in the group – I subjects, is found to be 32gms, which increases to 36.7 and 38gms/day in-group – II and group – III subjects respectively. In the last group i.e. 45 to 50 years, the daily dietary fiber consumption is found to increase tremendously to exhibit a mean value of 67gms, which is almost 76% more than the females belonging to group – III. Expression of daily dietary fiber consumption in relation to the body weight of the subjects, in the various age groups, demonstrate the same pattern as given above (Figure 10).

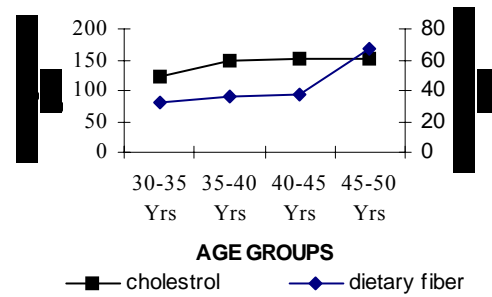


Figure 10: Average consumption of dietary fibres and cholesterol by females of different age groups



Figure 11: Comparison of dietary fibre and cholesterol intake by females grouped age



Dietary fiber, commonly known as “Bulk” or “Roughage” consists of carbohydrate plant substances that are difficult or impossible for the humans to digest. Instead, fiber passes through the intestinal tract and provides bulk for feces in the large intestine, some types of fibers are broken down by bacteria into acids and gases which explain why consuming too much fiber can lead to intestinal gas. Nutritionists classify dietary fibers as soluble or insoluble. Soluble fibers slow the body’s absorption of glucose and bind cholesterol containing compounds in the intestine, lowering blood cholesterol level and reduce the risk of cardiovascular diseases. On the other hand insoluble fibers bind water, making the feces bulkier and softer, so they pass more quickly and easily through the intestine.

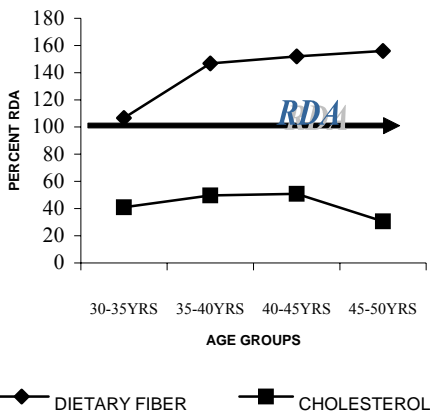


Figure 12: Dietary intake of fibre and cholesterol expressed as percent RDA

As per the recommendations of Dine Healthy System, an intake of 20 to 35gms/day of dietary fibers in the diet is considered good. The first three age groups of the study comprising of females from age 30 to 45 years consume the dietary fiber within the range of 20 to 35gms, but females belonging to the last age group takes dietary fibers much in excess of the recommendation of the Dine Healthy

System. There is no doubt that diet high in dietary fiber can help to prevent a variety of health problems including Constipation, Hemorrhoids and Diverticulitis. In addition to this some studies have linked high level of insoluble fiber in the diet with lower incidence of colon and rectal cancers. These subjects are therefore protected from the risk of running the above said diseases. The last group, comprising of females falling between the age range of 45 to 50 years, are observed to consume too much fiber (67gm/day) and thus are exposed to some medical problems such as large stools along with malabsorption of important minerals. It is therefore felt that for the fiber intake, as in all aspects of nutrition, balance and moderation as the key principle should be kept in mind.

**Daily Dietary Intake of Protein:**

Mean values of daily total dietary protein taken by females belonging to various age groups with their related statistical derivatives are presented in (Table 6, 13 & 14).

**Table 6: Dietary intake of Proteins**

	(30-35 Yr)	(35-40 Yr)	(40-45 Yr)	(45-50 Yr)
	Mean ±S.D.	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.
<b>Tot Prot</b>	47.70 ± 12.76	54.64 ± 5.28	67.27 ± 8.77	67.01 ± 7.81
<b>Animal Protein</b>	25.85 ± 6.38	24.29 ± 3.45	30.18 ± 8.95	30.28 ± 7.43
<b>Plant Protein</b>	21.85 ± 6.38	30.34 ± 3.78	37.09 ± 5.76	36.73 ± 5.26

On an average, 30 to 35 year age group females consumed 47.7gms of protein per day in their daily diet. The daily consumption of protein show a trend of increase with increase in age, so much so that 40 to 45 year old females consumed about 42% more protein in their daily diets

than the 30 – 35 year age group females (Figure 13).

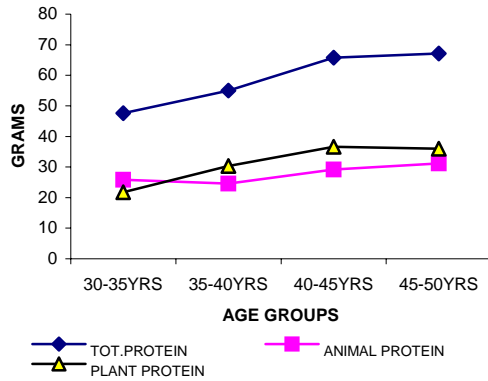


Figure 13: Average consumption of proteins in different age groups

This may be linked to the increase in body weight of these subjects with increase in age as has been reported earlier in the results. On accounting for the changes in body weight witnessed with increase in age, the daily protein consumption per kg of body weight reveal again a trend of general increase in protein consumption (Figure 14).

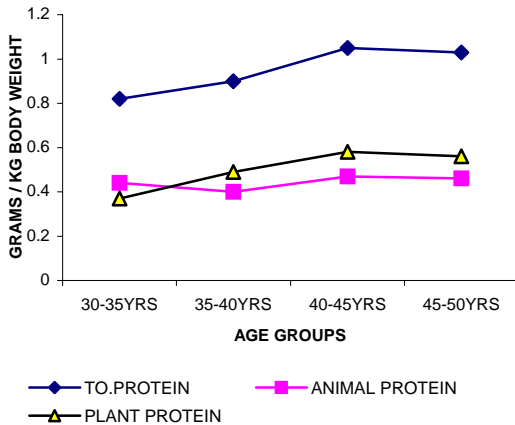


Figure 14: Comparison of protein consumption in females grouped by age

The contribution of proteins to the total energy intake reveals a mixed trend. Group I subjects are observed to contribute 9.9 % to the total energy intake which

increases to 11.3 % and 13.1 % for group – II and group –III subjects respectively. In group – IV i.e. females falling in the range of 45 to 50 years, the contribution of protein energy is observed to fall slightly to 12.6 percent (Figure 15).

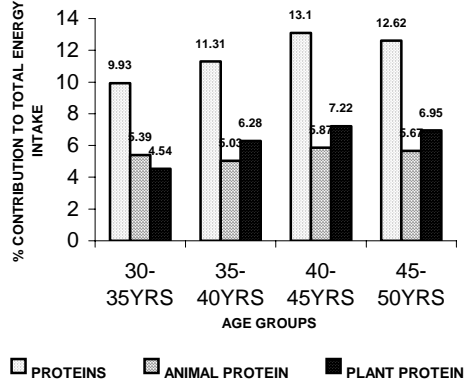


Figure 15: Percent contribution of proteins and its components to total energy intake

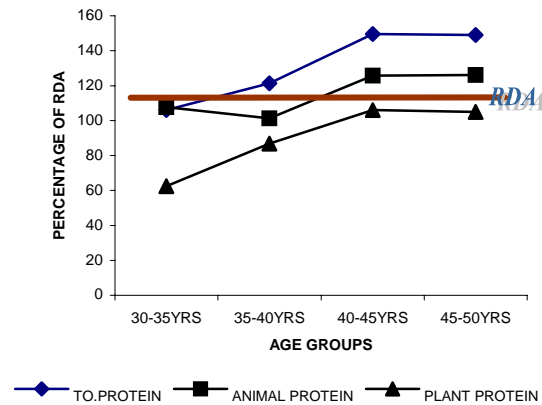


Figure 16: Dietary intake of proteins expressed as percent of RDA

Table 7: Percentage contribution of proteins towards total dietary energy intake

	(30-35 Yr)	(35-40 Yr)	(40-45 Yr)	(45-50 Yr)
	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.	Mean ± S.D.
<b>Tot Prot</b>	9.93 ± 2.34	11.31 ± 1.48	13.10 ± 1.75	12.62 ± 1.41

<b>Animal Protein</b>	5.39 ± 1.16	5.03 ± 0.85	5.87 ± 1.77	5.67 ± 1.33
<b>Plant Protein</b>	4.5 4± 1.18	6.28 ± 0.93	7.22 ± 1.13	6.95 ± 1.02

Protein is contained in the food from both animal and plant sources. Hence humans determine their supply of amino acids from these two sources. However, the human body cannot synthesize all amino acids and those amino acids that cannot be manufactured in the body are called essential amino acids and therefore must be present in diet consumed by the humans. It should be kept in mind that all 20 amino acids are necessary and must be present simultaneously for optimal maintenance of body growth and functions. In general, the protein we ingest from animal products is superior to those found in plants. The reason for the superiority of animal proteins over the plant proteins is (i) it contain all the essential amino acids, (ii) it contain all the essential amino acids in the proper proportion. Hence having the proper amount of animal protein in diet is the good way to ensure to receiving balance amount of amino acids and excellent sources include milk, cheese, meat and eggs. On the other hand proteins usually exist in smaller concentration in plant and may be lower in several of essential amino acids. Consequently most plant foods individually are unable to meet our nutritional needs. It is interesting to observe that amount of animal protein consumed by 30 to 35 year females is found to be higher as compared to the consumption of plant protein by them. In subsequent age groups, opposite trend is found i.e. females go for higher intake of plant proteins than the animal proteins in their daily diets. In relation to the body weight, the females belonging to the four age groups, exhibit the same trend as is observed for the total amount of both

animal and plant proteins. Most probable reason for the shift from higher animal protein consumption to higher plant protein consumption with the increase in age may be ascribed to the social and cultural factors prevailing in the Indian society. It is thought that so far the subjects belonging to the present study continue to consume plant food in proper combination that can provide a balanced supply of amino acids there is no need to worry on this account. An example of good combination of plant food that represents a complete protein is that of grain products and beans such as rice and bean. This balanced intake is extremely important for those practicing strict vegetarian habits.

After protein is digested in the body, the amino acids are generally utilized to form body tissues and other protein substances, such as enzyme and carbose. There is a word of caution for the subjects of the present study that any excess protein, which is consumed in the diet, may be converted to glucose or fatty acids and protein waste product may be excreted as urea. Fortunately, the amount of protein found in the first two age groups meets with the recommended dietary allowances given by Dine Healthy System. However group – III and group – IV females i.e. those falling in the age range of 40 to 50 years are observed to exceed the recommended dietary allowances (RDA) by almost 50% (Figure16). The excess protein consumption by them may be getting accumulated in the form of fat and this is actually what has been seen in these subjects who are found to possess a very high percentage of fat in their body. A simultaneous high consumption of animal protein along with substantial amount of saturated fat and cholesterol may thus pose severe health problems. Some people argue that excess protein even has direct catabolic

effect on bones due to increased endogenous acid production and they point to increase urine calcium levels, especially after animal protein consumption. These females need to be advised to reduce the intake of fat while maintaining adequate protein intake. To cite an example, a glass of whole milk and glass of skimmed milk

both have about 8 gm of protein but whole milk has 8 gm of fat compared to only 1 gm or less of fat in the skim milk. Thus drinking a glass of skimmed milk instead of whole milk help to reduce fat intake by 7gms and save about 60 calories.

**Table 8: Comparison of Mean Daily Total energy intake and Daily Total Energy Expenditure among females belonging to different age groups**

Parameters	Groups I & II	Groups I & III	Groups I & IV	Groups II & III	Groups II & IV	Groups III & IV
Total Caloric Intake, Cal	1.41	6.75*	9.70*	6.59*	10.32*	3.73*
Total Energy Expenditure, Cal	0.64	1.58	4.22*	2.75*	5.75*	3.36*

\* Stands for statistically significant 't' values at 0.05

**TABLE 9: Comparison of mean values of daily dietary intake of fats among females belonging to different age groups**

Parameters	Groups I & II	Groups I & III	Groups I & IV	Groups II & III	Groups II & IV	Groups III & IV
Total Fats (gm)	7.50*	4.93*	16.02*	2.65*	9.48*	11.73*
Saturated Fats	5.74*	7.13*	6.31*	1.51	0.91	0.52
Monounsaturated Fat	9.62*	75.85*	9.91*	13.08*	0.70	12.84*
Polyunsaturated Fat	0.20	1.43	1.89	1.39	1.92	0.47
Animal Fat	7.55*	14.30*	11.64*	7.93*	5.06*	2.60*
Plant Fat	1.49	11.68*	8.00*	12.63*	6.31*	18.87*
Cholestrol (mg)	6.56*	7.65*	7.28*	1.14	0.83	0.29

\* Stands for statistically significant 't' values at 0.05

**Table 10: Statistical Comparison of %age contribution of daily dietary intake of fats to total energy intake among females belonging to different age groups**

Parameters	Groups I & II	Groups I & III	Groups I & IV	Groups II & III	Groups II & IV	Groups III & IV
Total Fats (gm)	6.54*	0.55	9.34*	8.61*	2.26*	12.84*
Saturated Fats	5.58*	4.65*	2.34*	1.49	3.25*	2.03*
Mono Fat	9.16*	7.07*	4.71*	195	3.92*	2.00*
Poly Fat	0.92	2.34*	3.24*	2.01*	3.29*	1.19
Animal Fat	7.41*	13.22*	8.80*	4.59*	0.61	4.28*
Plant Fat	0.13	13.86*	1.81	17.17*	2.11*	19.21*

\* Stands for statistically significant 't' values at 0.05

**Table 11: Statistical comparison of daily dietary intake of Carbohydrates among females belonging to different age groups**

Parameters	Groups	Groups	Groups	Groups	Groups	Groups
	I & II	I & III	I & IV	II & III	II & IV	III & IV
Total Carb (gm)	3.55*	1.31	1.25	5.95*	3.11*	3.47*
Nat Sugar	1.85	4.51*	0.59	7.49*	1.65	6.80*
Added Sugar	4.80*	6.72*	1.69	2.42*	3.54*	5.71*
Dietary Fiber	5.99*	7.46*	9.42*	1.79	3.54*	1.51

\* Stands for statistically significant 't' values at 0.05

**Table 12: Statistical comparison of %age contribution of daily dietary intake of carbohydrates to total energy intake among females belonging to different groups**

Parameters	Groups	Groups	Groups	Groups	Groups	Groups
	I & II	I & III	I & IV	II & III	II & IV	III & IV
Total Carbohydrate (gm)	7.12*	5.20*	12.11*	2.85*	4.82*	9.00*
Nat Sugar	4.19*	0.38	10.36*	5.17*	5.43*	13.10*
Added Sugar	5.43*	8.35*	4.42*	3.62*	1.30	4.91*

\* Stands for statistically significant 't' values at 0.05

**Table 13: Statistical comparison of mean values of daily dietary intake of Proteins among females belonging to different age groups**

Parameters	Groups	Groups	Groups	Groups	Groups	Groups
	I & II	I & III	I & IV	II & III	II & IV	III & IV
Total Protein (gm)	5.02*	12.63*	12.90*	12.32*	13.11*	0.21
Animal Protein	2.14*	3.93*	4.52*	6.13*	7.30*	0.09
Plant Protein	11.45*	17.72*	17.97*	9.78*	9.84*	0.46

\* Stands for statistically significant 't' values at 0.05

**Table 14: Statistical comparison of %age contribution of daily dietary intake of proteins to total energy intake among females belonging to different age groups**

Parameters	Groups	Groups	Groups	Groups	Groups	Groups
	I & II	I & III	I & IV	II & III	II & IV	III & IV
Total Protein (gm)	4.95*	10.79*	9.85*	7.77*	6.47*	1.86
Animal Protein	2.48*	2.27*	1.80	4.27***	4.16***	0.66
Plant Protein	11.50*	16.34*	15.40*	6.41*	4.82*	1.81

\* Stands for statistically significant 't' values at 0.05

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