CHAPTER 6

FOOD HABIT, NUTRITIONAL STATUS AND DISEASE

Food

Food is the first and the foremost among the six basic human needs. Food is consumed in order to provide nourishment to the body for its proper functioning. Improper food intake results in various forms of health hazards leading to poor physical and mental growth and development. The foods that we eat contain nourishing substances called nutrients. There are five main types of nutrients: carbohydrates, proteins, fats, vitamins and minerals. Some foods like rice is rich in carbohydrates, dal is rich in proteins and cooking oil is rich in fat. Some foods like milk contains several nutrients. Carbohydrates, proteins and fats are needed in large amounts, and all of them supply energy to keep the body going. Vitamins and minerals are required in small amount. Foods provide us energy. We all know that one may be weak and thin by not getting enough food. We sometimes vaguely feel that certain foods are good for the liver or helpful for the eyes etc. Yet it is rarely that we attribute actual ill-health or bad functioning of the body to some fault in the diet. The usual tendency is to put it down to an infection, and it is called disease (Achaya, 1974).

Food in old age

Old people are physically less active, and therefore need less food. After the age of 60, the calorie requirement could be brought down by about a third. At this age food habits cannot obviously change drastically but the amount of food can be reduced within the existing pattern. Less, weight also means less strain on the bones, less risk of falling down and less harm if it happens. Some teeth may be lost, and soft foods are necessary. The digestive system loses some of its tone and constipation is

more common. Fats especially tend to be badly digested. The kidneys are usually less efficient. Cereals like rice and wheat should be cooked as soft as possible. Dals, if found gas-forming, should be cut down. Foodstuffs with less fiber should be chosen and ground up as fine as possible (Achaya, 1974).

Some nutrient and their specific role an ageing process

Nutrient	Physiological Role	Specific Role in Aging Process
1. Iron	Immuno-competence	Preventing vulnerability to infectious disease in old age.
2. Iron/folate	Prevention of anemia	Maintaining appropriate levels of activity in old age.
3. Calcium	Bone calcification	Preventing osteoporosis and fractures in old age through falls and other types of accident.
4. Selenium	Antioxidants	Preventing free-radical damage in the biological process of aging.
5. Vit.A Beta-Carotene, Ascorbic acid, Vit. E, Lycopene	Antioxidants	Preventing free radical damage in old age eg. Atheroscelerosis cataract, prevention of maliganancies and controlling free radical damage on other tissues and enzyme system.

Diet planning of the aged

The aged need special care. With advance in age a person is less active and may also suffer from some health problems related to age. These factors greatly influence the dietary intake and nutritional status of the old people. As activity is reduced the aged may have reduced energy requirement, but the requirement for other nutrients remains the same.

The changes that take place in old age are cellular changes, function of gastrointestinal tract, cardiovascular system, nervous system, renal system, skeletal changes. Because of this some common problems of the aged are- loss of natural teeth, poor digestion and constipation, diabetes, blood pressure, heart diseases etc. Loss of natural teeth makes it difficult to chew food properly and eat hard foods easily. They must be given foods of soft consistency and texture like boiled vegetables, khichiri, dalia etc. Muscular movement in old age is slow, hence not only does it affect mobility, it also effects digestion and defecation. The peristalsis movement of the stomach muscles is also disturbed, leading to poor digestion and constipation.

For the aged, as there is less activity so the energy requirement is also less, but the requirement for other nutrients is the same. They must be served small but frequent meals. Their food should include plenty of roughage and water or fluids (Achaya, 1974).

Food habit of the aged Kaibartas

The aged Kaibartas generally take two meals a day i.e., lunch and dinner. In the morning most of the people take chappati or bread with tea. Individuals who are in service they take their meal in the morning. In their mid day meal they generally take rice with dal, vegetables, fish or meat. But those who are economically not sound they take only rice and vegetables but not fish and meat regularly. Rickshaw pullers or daily labourers are not able to take dal, fish or meat in their daily meal everyday. They take fish or meat occasionally or in the festivals like the Bohag Bihu, Magh Bihu, Dol ustav (Holi) etc. Milk is rarely taken by them. The elderly people prefer fish instead of meat and egg.

Food restriction

The aged Kaibartas of the study areas have some restrictions in food in some occasions because the people are living near to the Barpeta Satra (Kirtanghar) which is one of the holy places of Assam. In the 'Tithis' i.e., death anniversary of the Mahapurush Sri Sri Sankardeva, Madhavdeva and Mathuradas Burha Atta (the first Satradhikar of Barpeta Satra) the aged do not take cooked foods, but they take only curd, fruits and milk.

It has been observed in the field that in most of the families there is no special food for the aged persons. The aged who are suffering from different type of diseases or health problems also do not have much restriction in their food. They have no idea about the restriction of the some food items on some diseases.

Table 6.1

Food habit of the aged

Type of food	Aged persons		
	Male	Female	Total
Vegetarian	25(10.0)	75(30.0)	100(20.0)
Non-Vegetarian	225 (90.0)	175(70.0)	400(80.0)
Total no. of Individuals	250	250	500

(Figures within brackets indicate percentages)

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Fig. 6.1 Food habit of the aged
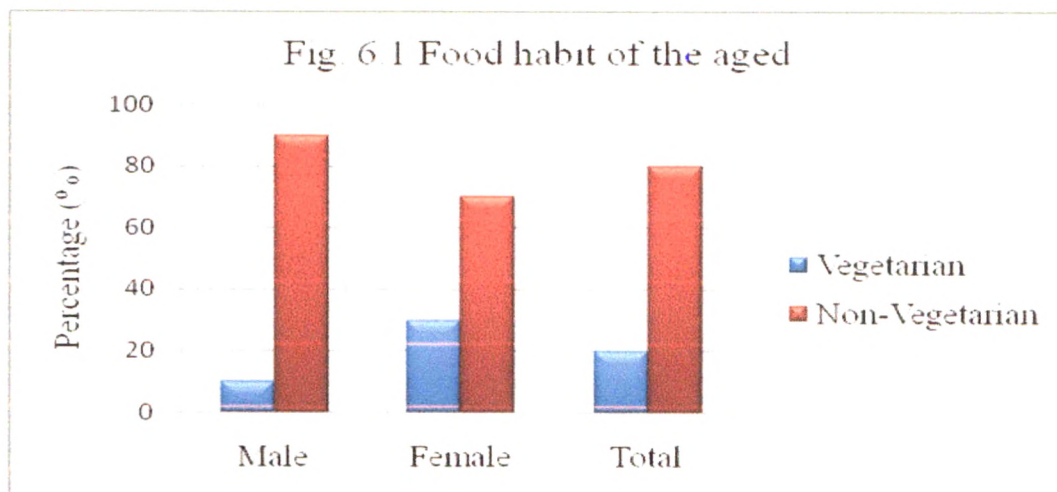
The table 6.1 shows the food habit of the Aged Kaibartas. 80% people are non-vegetarian; 30% women are vegetarian while only 10% male are vegetarian.

Table 6.1 (A)

Restriction in diet of the aged

Type of food	Aged		
	Male	Female	Total
Restricted diet	55(22.0)	43 (17.2)	98(19.6)
Non-restricted diet	195(78.0)	207(82.8)	402(80.4)
Total no. of individuals	250	250	500

(Figures within brackets indicate percentages)

The table 6.1(A) is for restricted diet of the aged Kaibartas. Generally the people above 40 years of age have some restrictions of intake of sugar, spicy food etc. but here it is seen that out of 500 individuals 402 i.e. 80.4% have no restriction on food only 19.6% have restrictions on some food items.
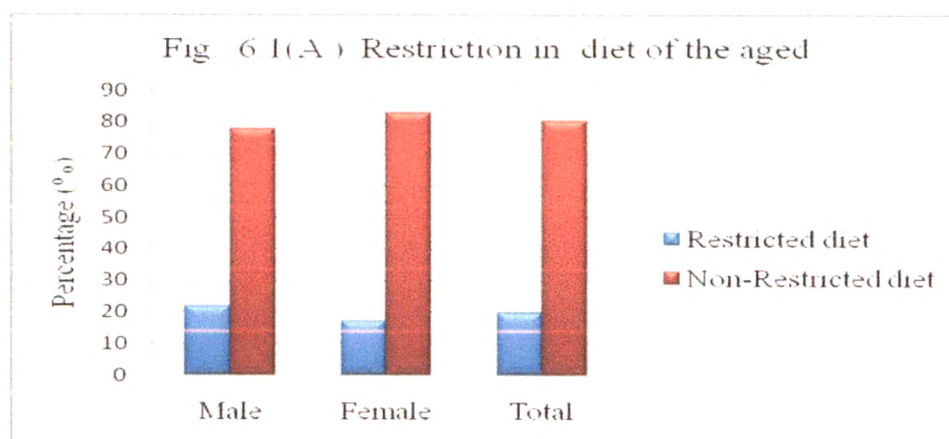

Fig. 6.1(A) Restriction in diet of the aged

Table 6.1 (B)

Preference of non-vegetarian food of the aged

Type of non-vegetarian food	Aged		
	Male	Female	Total
Egg	06 (2.4)	11 (4.4)	17 (3.4)
Fish	09 (3.6)	45 (18.0)	54 (10.8)
Meat	23 (9.2)	09 (3.6)	32 (6.4)
Egg, Fish or Meat	187 (74.8)	110 (44.0)	297 (59.4)
Total no of Individuals	250	250	500

(Figures within brackets indicate percentages)

The table 6.1 (B) is for the preference of food of the aged persons. Among the aged Kaibartas only 3.4% prefer only egg, 10.8% prefer only fish and 59.4% prefer any of the non-vegetarian items like fish, meat or egg.
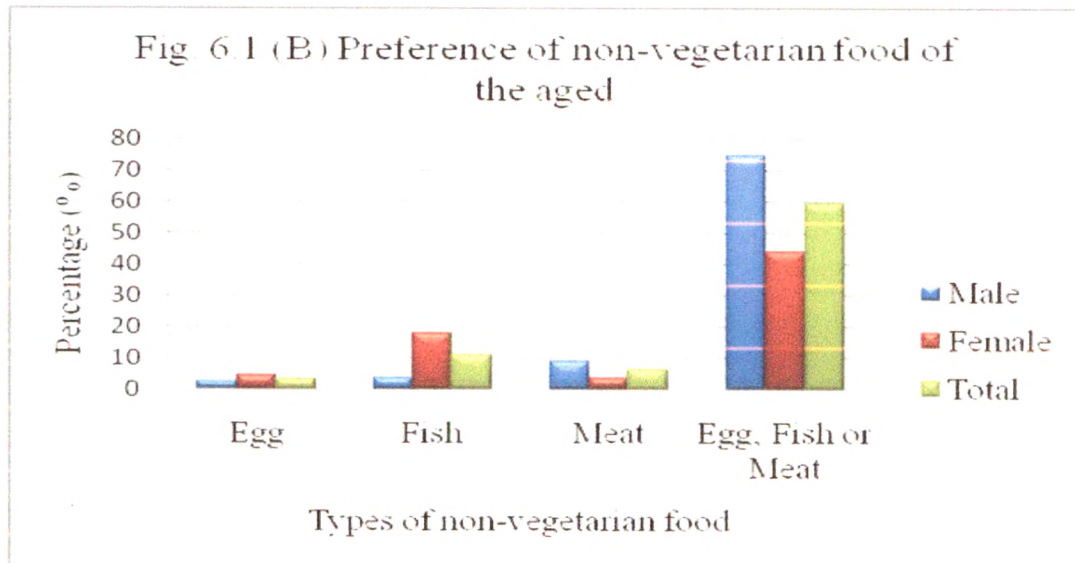

Fig. 6.1 (B) Preference of non-vegetarian food of the aged

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Table 6.1 (C)

Habit of chewing & smoking and drinking alcohol of the aged

Type of habit	Aged	
	Male	Female
Chewing betel nut, supari	235 (94.0)	239 (95.6)
Smoking	178 (71.2)	-
Drinking alcohol	113 (45.2)	-
Total no. of Individuals	250	250

(Figures within brackets indicate percentages)

The table 6.1 (C) show distribution of aged Kaibartas according to the habit of smoking, chewing betelnut, "supari" (dry betel nut) and drinking alcohol. Among the males 94% have the habit of chewing betelnut, betel leaf, supari etc. 71.2% are smokers and 45.2% have the habit of drinking alcohol. On the other hand 95.6% women are chewers of betel nut and betel leaf and supari.

Fig 6 1 (C) Habit of chewing & smoking and drinking alcohol of the aged
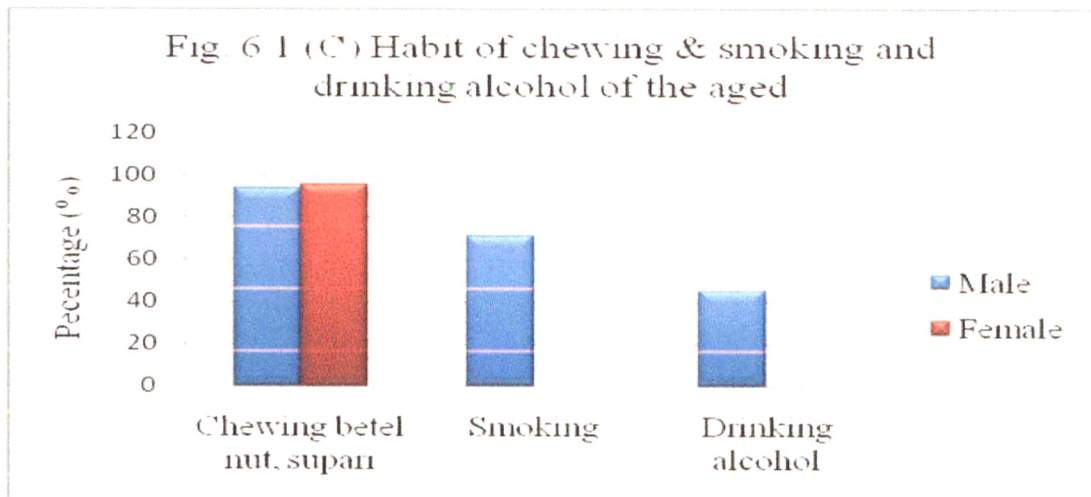
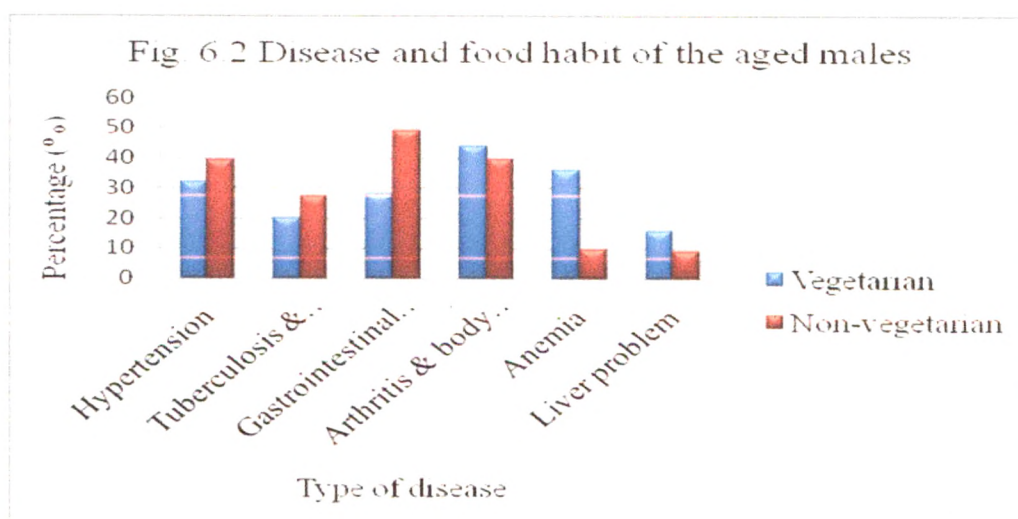**Food habit and disease of the aged**

It has been tried to see the food habits and diseases of the aged Kaibartas of the study areas. For this some of the frequently occurring diseases like hypertension, tuberculosis & asthma, gastrointestinal disorder, arthritis & body pain, eye ailments, anemia, liver problem and headache are considered.

Table 6.2

Disease and food habit of the aged males

Type of disease	Vegetarian	Non-vegetarian
Hypertension	08 (32.0)	88 (39.1)
Tuberculosis & asthma	05 (20.0)	62 (27.5)
Gastrointestinal disorder	07 (28.0)	110 (48.9)
Arthritis & body pain	11 (44.0)	89 (39.5)
Anemia	09 (36.0)	22 (9.8)
Liver problem	04 (16.0)	20 (8.9)
Total no. of individuals	25	225

(Figures within brackets indicate percentages)

The table 6.2 shows the food habit and some disease of the aged males. The habit has been divided in to two categories like vegetarian and non-vegetarian. From the table it is found that the percentages for diseases like hypertension, tuberculosis & asthma and gastrointestinal disorder are higher among the aged who are non-vegetarian. Out of 225 non-vegetarians, 39.1% are suffering from hypertension; 27.5% are suffering from tuberculosis & asthma and 48.9% are suffering from gastrointestinal disorder. On the other hand, the persons who are vegetarian are suffering from arthritis & body pain, anemia and liver problem. Out of 25 vegetarian, 44.0% are suffering from arthritis & body pain; 36.0% are suffering from anemia and 16.0% are suffering from liver problem.
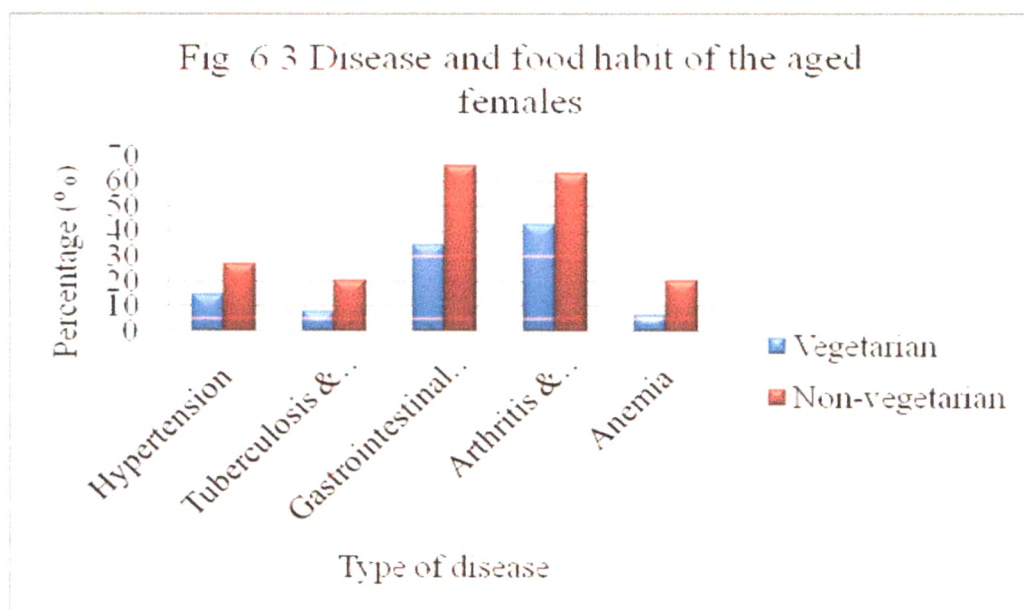

Fig. 6.2 Disease and food habit of the aged males

Fig. 6.3 Disease and food habit of the aged females

Table 6.3

Disease and food habit of the aged females

Type of disease	Vegetarian	Non-vegetarian
Hypertension	11(14.7)	47(26.8)
Tuberculosis & asthma	06(8.0)	36(20.6)
Gastrointestinal disorder	26(34.7)	116(66.3)
Arthritis & body pain	32(42.7)	111(63.4)
Anemia	05(6.6)	36(20.6)
Total no of Individuals	75	175

(Figures within brackets indicate percentages)

The table 6.3 shows the food habit and diseases of the aged females. From the table it is seen that most aged females suffering from various types of diseases are non-vegetarian. In the hypertension there are 26.8% who are non-vegetarian; in

tuberculosis & asthma it is 20.6%; in gastrointestinal disorder it is 66.3%; in arthritis & body pain it is 63.4% and in anemia it is 20.6%.

Table 6.4

Disease and restriction of food of the aged males

Frequently occurring disease	Having restriction in diet	No-restriction in diet
Hypertension	08(14.5)	88(45.1)
Tuberculosis & asthma	06(10.9)	61(31.3)
Gastrointestinal disorder	18(32.7)	99(50.8)
Arthritis & body pain	12(21.8)	88(45.1)
Anemia	03(5.4)	28(14.3)
Liver problem	02(3.6)	22(11.3)
Total no. of Individuals	55	195

(Figures within brackets indicate percentages)

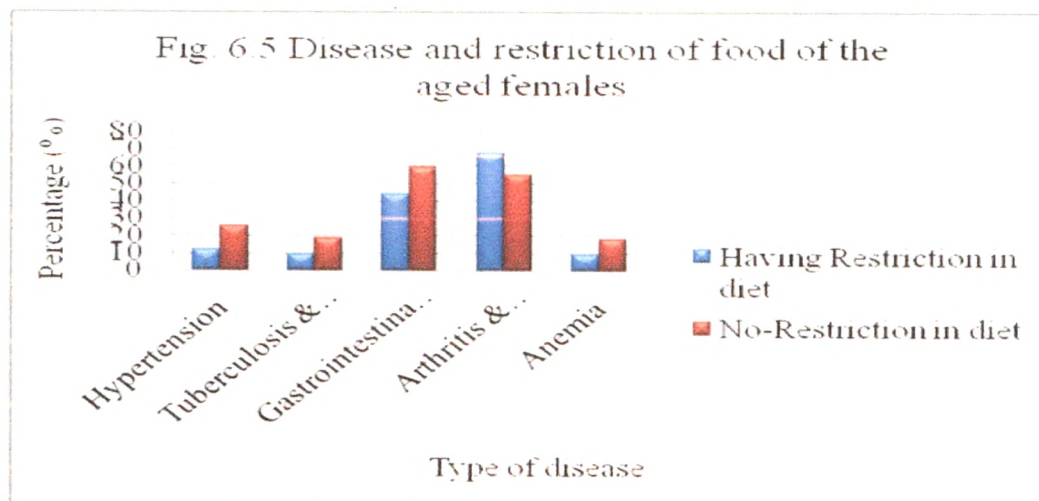Fig. 6.4 Disease and restriction of food of the aged males
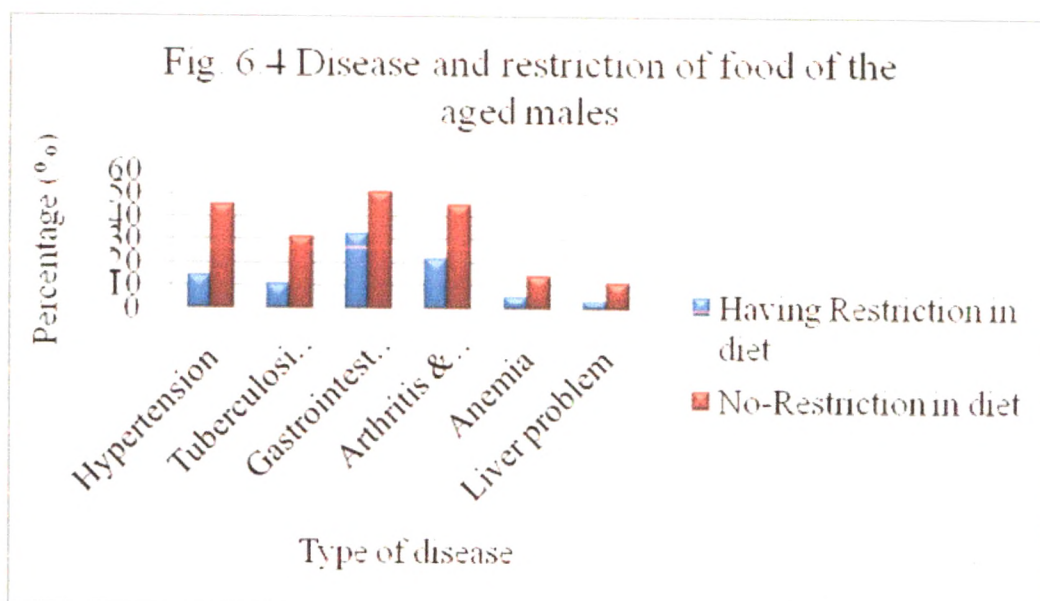
The table 6.4 shows the disease and food restriction of the aged males. From the table it is seen that the percentage of diseases is higher among the persons who have no-restriction in their foods. Out of 195 aged persons who have no restriction in their diet, 45.1% are suffering from hypertension; 31.3% are suffering from tuberculosis & asthma; 50.8% are suffering from gastrointestinal disorder; 45.1% are suffering from arthritis & body pain; 18.5% are suffering from eye ailments; 14.3% are suffering from anemia; 11.3% are suffering from liver problem and 10.7% are suffering from headache.

Table 6.5

Disease and restriction of food of the aged females

Frequently occurring disease	Having restriction	No restriction
Hypertension	05(11.6)	53(25.6)
Tuberculosis & asthma	04(9.3)	38(18.3)
Gastrointestinal disorder	19(44.2)	123(59.4)
Arthritis & body pain	29(67.4)	114(55.1)
Anemia	04(9.3)	37 (17.9)
Total no. of Individuals	43	207

(Figures within brackets indicate percentages)

Fig. 6.5 Disease and restriction of food of the aged females

The table 6.5 shows the disease and restriction of food of the aged females. From the table it is seen that the females who have restriction in their food are suffering from arthritis & body pain frequently. Out of 43 females who have restriction in their food, 67.4% are suffering from arthritis & body pain and 44.2% are suffering from; gastrointestinal disorder. On the other hand out of 207 females who have no restriction in their diets, 25.6% are suffering from hypertension; 18.3% are suffering from tuberculosis & asthma; 59.4% are suffering from gastrointestinal disorder; and 17.9 % are suffering from anemia.

Nutritional status of the aged Kaibartas

Nutritional care of the old

Older adults have essentially the same human needs as the younger adults. With ageing a progressive decline in the water content and the lean body mass is accompanied by an increasing proportion of body fat. Besides, there is an increase in the amount of collagen and joints become rigid. The skin loses its flexibility, the joints creak and back starts to bend. Performance is reduced due to decline in the number of functioning cells of various organs. The sense of taste and smell are less acute, so that some of the pleasures derived from food is lost. Less saliva is secreted, so that swallowing becomes more difficult. There is teeth loss, so chewing is difficult too. Hence they need more soft food. The digestive juices are also not functioning well, and hence, there is intolerance of fat, rich and spicy food. Complaints of indigestition, gastritis and constipation are more frequent with them. Folacin deficiency is fairly common and leads to macrobiotic anemia. Osteoporosis leading to spontaneous fractures and hormonal imbalances are quite common at this age.

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Good diet in later years cannot completely make up for the years of inadequacy or correct irreversible changes. Furthermore, an older person cannot completely change his or her pattern of eating.

The aged need special care. With advance in age the person is less active and may also suffer from some health problems related to age. These factors greatly influence the dietary intake and nutritional status of the old people (Mullick, 2006).

Body Mass Index (BMI)

Body mass index or BMI (weight in kilograms divided by the square of the height in meters) is promulgated by the World Health Organization as the most useful epidemiological measures of obesity. It is nevertheless a crude index that does not take into account the distribution of body fat, resulting in variability in different individuals and populations (WHO, 2002).

Body mass index (BMI) is calculated by dividing the weight of an individual in kg by the square of his or her height measured in meters (Reddy et. al.2002).

The nutritional status of the aged Kaibartas has been classified following the James et.al classification of nutritional grading. There are five categories in the classification. These are CED-Malnutrition (<18.5); low normal (18.5-20.0); normal (20.0-25.0); overweight (25.0-30.0) and obese (>30.0).

Table 6.6

Age and BMI of the aged males

Age groups in years	BMI								
	Range		Mean ±SE		Std Deviation ±SE		C.V ±SE		Total no of individuals
55-59	25.13	13.86	19.45	0.22	2.44	0.16	12.55	0.81	120
60-64	25.45	14.97	19.69	0.35	2.45	0.25	12.44	1.24	50
65-69	24.48	16.97	20.64	0.39	2.11	0.27	10.22	1.32	30
70-74	21.87	13.12	18.36	0.54	2.41	0.38	13.13	2.08	20
75+	20.93	15.84	18.22	0.28	1.56	0.20	8.56	1.10	30
Total	25.45	13.12	19.40	0.15	2.39	0.11	12.32	0.55	250

The table 6.6 shows the age wise distribution of body mass index of the aged males. From the table it is seen that the mean value of the aged are 19.40 and it falls in low normal category. The highest mean value is found among the 65-69 years age group and it is

20.64(Normal) and the lowest mean value is found among in the 75 years & above 75 years age group and it is 18.22 (Malnourished).

Table 6.7

Age and BMI of the aged females

Age groups in years	BMI							
	Range		Mean ±SE		Std Deviation ±SE		C.V ±SE		Total no. of individuals
50-54	28.06	14.42	20.00	0.25	2.45	0.18	12.25	0.89	95
55-59	26.67	13.88	20.06	0.54	2.93	0.38	14.61	1.89	30
60-64	29.26	13.88	20.06	0.44	2.59	0.31	12.91	1.54	35
65-69	23.05	16.63	19.88	0.38	1.88	0.27	9.46	1.34	25
70-74	28.14	13.88	18.93	0.33	2.09	0.23	11.04	1.23	40
75+	20.92	16.91	18.83	0.19	0.99	0.14	5.26	0.74	25
Total	29.26	13.88	19.72	0.15	2.36	0.11	11.97	0.54	250

The table 6.7 shows the age wise distribution of body mass index of the aged females. From the table it is seen that the mean value of the aged females are 19.72 (Low normal). In age wise distribution it is seen that the highest mean value is found among in the 55-59 years and 60-64 years age group and the mean value is 20.06 (Normal). The lowest mean value is found in the 75 years and above 75 years age group and it is 18.83 (Malnourished).

Table 6.8

Nutritional status of the aged males

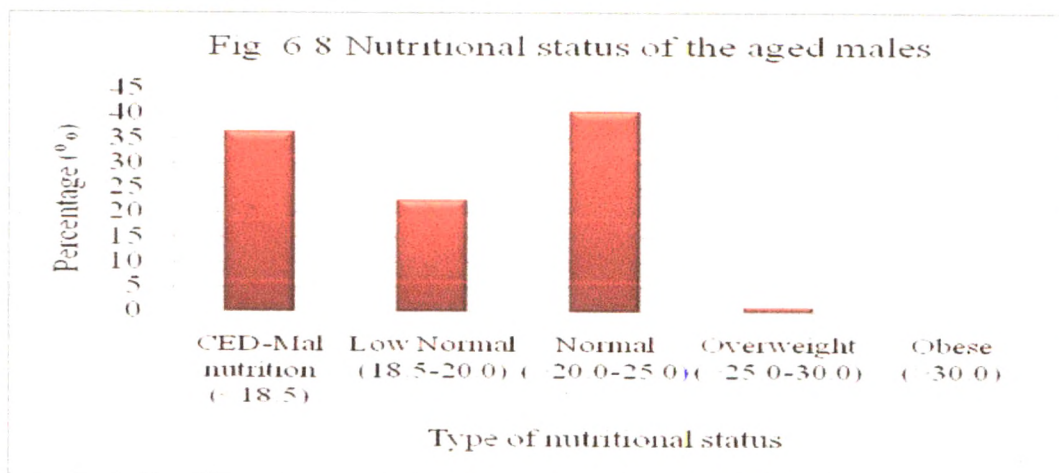| Age groups in years	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
55-59	46	22	51	01	-	120
60-64	17	09	23	01	-	50
65-69	04	11	15	-	-	30
70-74	10	04	06	-	-	20
75+	14	10	06	-	-	3 0
Total	91 (36.4)	56 (22.4)	101 (40.4)	02 (0.8)		250

Fig 6 8 Nutritional status of the aged males

Table 6.8 shows the nutritional status of the aged males. It is clear from the table that when the aged persons are considered as a whole, 40.4% are in normal (>20.0-25.0) category and it is the highest. 36.4% are mal nourished (<18.5) category and 22.4% are in low normal (18.5-20.0) category. In obese category no one is there and only 0.8% are over weight (>25.0). When it is considered age wise (Table 6.9) it is seen that in 70-74 years age group, 50.0% are in CED-mal nourished category and it is the highest. In age wise distribution in normal category the percentage is 50.0 and it is found in the 65-69 years age group. In over weight category there are two aged persons and one each in the 55-59 and 60-64 years of age group.

Table 6.9

Age wise nutritional status of the aged males

Age groups in years	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
55-59	46(38.3)	22(18.3)	51(42.5)	01(0.8)	-	120
60-64	17(34.0)	09(18.0)	23(46.0)	01(2.0)	-	50
65-69	04(13.3)	11(36.7)	15(50.0)	-	-	30
70-74	10(50.0)	04(20.0)	06(30.0)	-	-	20
75+	14(46.7)	10(33.3)	06(20.0)	-	-	3 0

(128)

Fig 6.9 Age wise nutritional status of the aged males

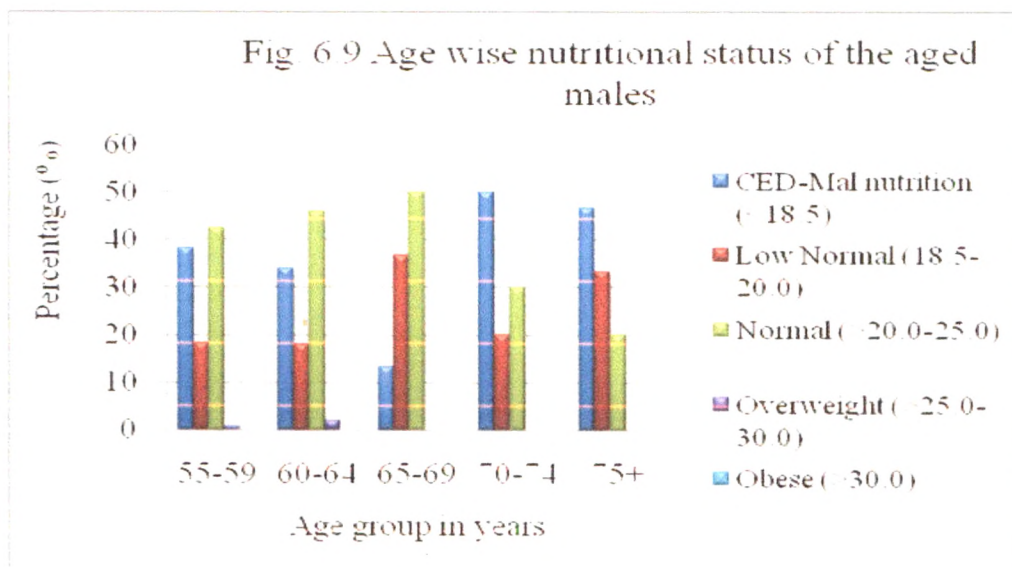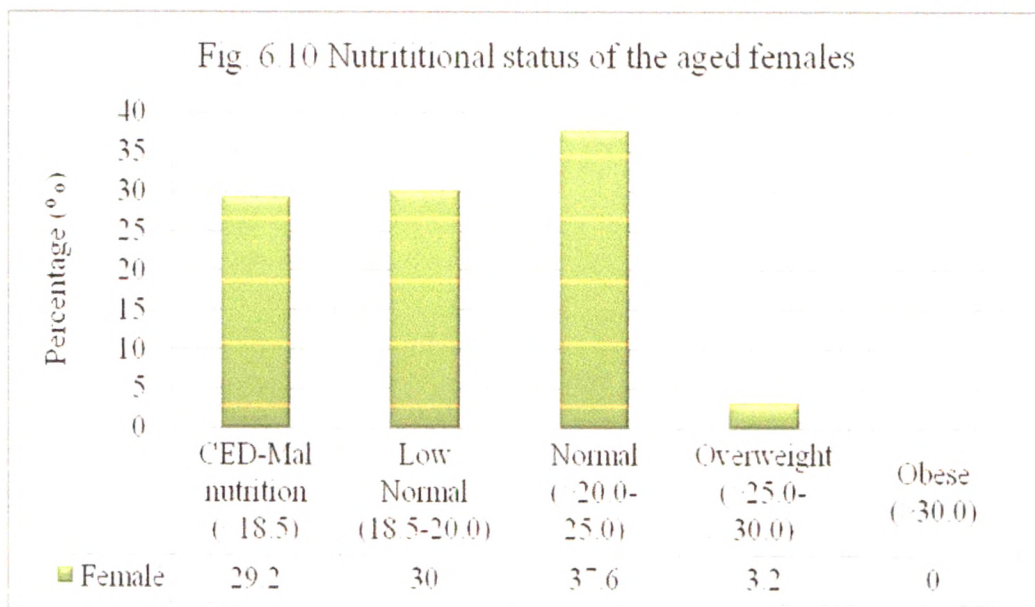**Table 6.10**

Nutritional status of the aged females

Age groups in years	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
50-54	22	30	40	03	-	95
55-59	10	06	12	02	-	30
60-64	08	09	16	02	-	35
65-69	07	05	13	-	-	25
70-74	17	14	08	01	-	40
75+	09	11	05	-	-	25
Total	73(29.2)	75(30.0)	94(37.6)	08(3.2)		250

Fig. 6.10 Nutritutional status of the aged females

	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)
Female	29.2	30	37.6	3.2	0

The table 6.10 shows the nutritional status of the aged females. From the table it is found that out of 250 aged females, 29.2% are in CED-malnutrition (<18.5) category, 30% are in low normal (18.5-20.0) category, 37.6% are in normal (>20.0-25.0) category and 3.2% aged females are in over weight (>30.0) category.

Table 6.11
Age wise nutritional status of the aged females

Age groups in years	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
50-54	22 (23.2)	30(31.6)	40(42.1)	03(3.2)	-	95
55-59	10(33.3)	06(20.0)	12(40.0)	02(6.7)	-	30
60-64	08(22.9)	09(25.7)	16(45.7)	02(5.7)	-	35
65-69	07(28.0)	05(20.0)	13(52.0)	-	-	25
70-74	17(42.5)	14(35.0)	08(20.0)	01(2.5)	-	40
75+	09(36.0)	11(44.0)	05(20.0)	-	-	25

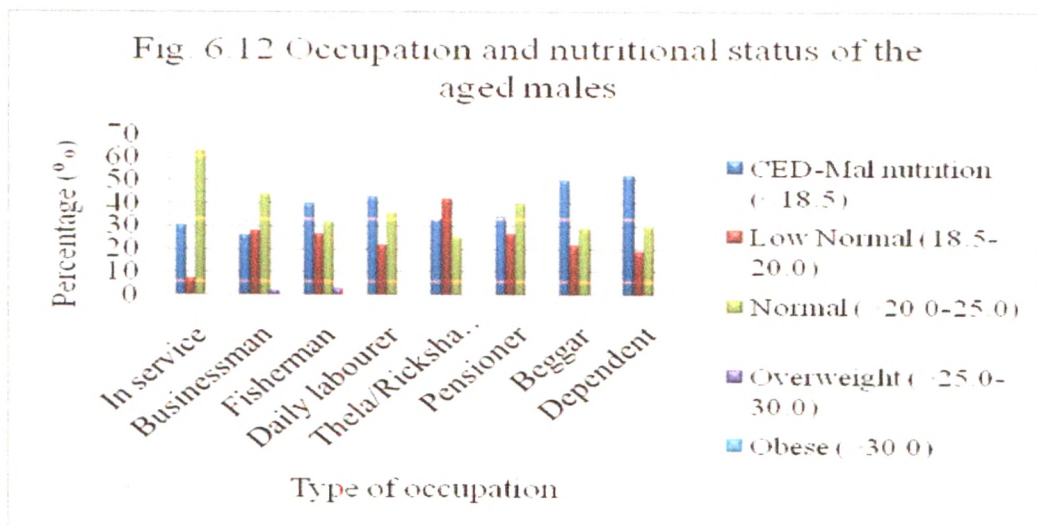Fig. 6.11 Age wise nutritional status of the aged females
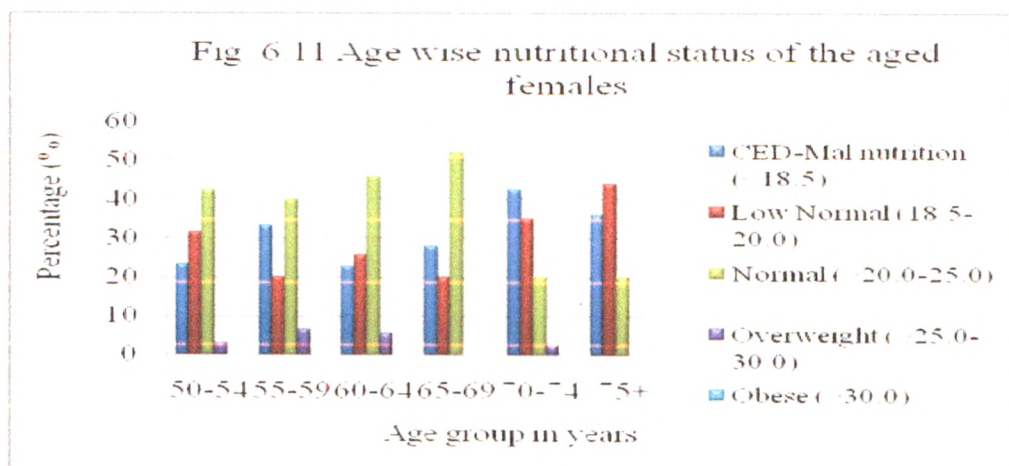
The table 6.11 shows the age wise nutritional status of the aged females. It is found from the table that most of the CED-Malnourished aged females are in the later age groups. In the age group 50-54 the CED-Malnourished is 23.2%; in 55-59 it is 33.3%; in 60-64 it is 22.9%; in 65-69 it is 28%; in 70-74 it is 42.5% and in the age group of 75+ years it is 36.0%. The percentage in low normal category (18.5-20.0) is also found to be higher in the later age groups. In the females 3.2% over weight are in the 50-54 years age group; 6.7% in the 55-59 years age group; 5.7% are in the 60-64 years age group and 2.5% are in the 70-74 years age group.

Table 6.12

Occupation and nutritional status of the aged males

Types of Occupation	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
In service	13 (30.2)	03 (6.9)	27 (62.8)	-	-	43
Businessman	13 (26.0)	14 (28.0)	22 (44.0)	01 (2.0)	-	50
Fisherman	15 (39.5)	10 (26.3)	12 (31.6)	01 (2.6)	-	38
Daily labourer	12 (42.9)	06 (21.4)	10 (35.7)	-	-	28
Thela/Rickshaw puller	04 (33.3)	05 (41.7)	03 (25.0)	-	-	12
Pensioner	13 (34.2)	10 (26.3)	15 (39.5)	-	-	38
Beggar	07 (50.0)	03 (21.4)	04 (28.6)	-	-	14
Dependent	14 (51.9)	05 (18.5)	08 (29.6)	-	-	27

(131)

Fig. 6.12 Occupation and nutritional status of the aged males

The table 6.12 shows the occupation wise nutritional status of the aged male. From the table it is seen that persons in CED-malnourished category are found to be higher among the dependents. Out of 27 dependents, 51.9% are in CED-malnourished category. The second highest percentage is found among the beggar. Out of 14 beggars, 50% are in category CED-malnourished (<18.5). From the table it can be said that most of the serviceman (62.8%), businessman (44.0%) and pensioner (39.5%) are in the normal (>20.0-25.0) category. Most of the fisher man (39.5%) and the daily labourer (42.9%) are in CED-malnourished category. Out of 12 persons thela pullers or rickshaw pullers (41.7%) are in low normal (18.5-20.0) category. Out of 250 aged males only 2 persons are in overweight category and one of them is businessman (2.0%) and other one is fisherman (2.6%).

Table 6.13

Occupation and nutritional status of the aged females

Types of Occupation	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
In service	-	05(38.5)	08(61.5)	-	-	13
Businessman	03(42.9)	03(42.9)	01(14.3)	-	-	07
Daily labourer	15(45.5)	08(24.2)	10(30.3)	-	-	33
Pensioner	09(21.9)	16(39.0)	14(34.1)	02(4.9)	-	41
Beggar	02(33.3)	-	04(66.7)	-	-	06
Weaving	09(22.5)	11(27.5)	18(45.0)	02(5.0)	-	40
Dependent/House -wives	35(31.8)	32(29.1)	39(35.5)	04(3.6)	-	110

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The table 6.13 shows the occupation wise nutritional status of the aged females. From the table it is seen that most of the aged females who are in service are in normal category. Out of 13 women who are in service, 61.5% are in normal (>20.0-25.0) category. Most of the daily labourers are in CED-Malnourished (<18.5) category and the percentage is 45.5%. Most of the pensioners are also in low normal category (18.5-20.0) and the percentage is 39.0%. The highest percentages of aged females who are beggars, weavers and dependents or house-wives are in normal (>20.0-25.0) category.
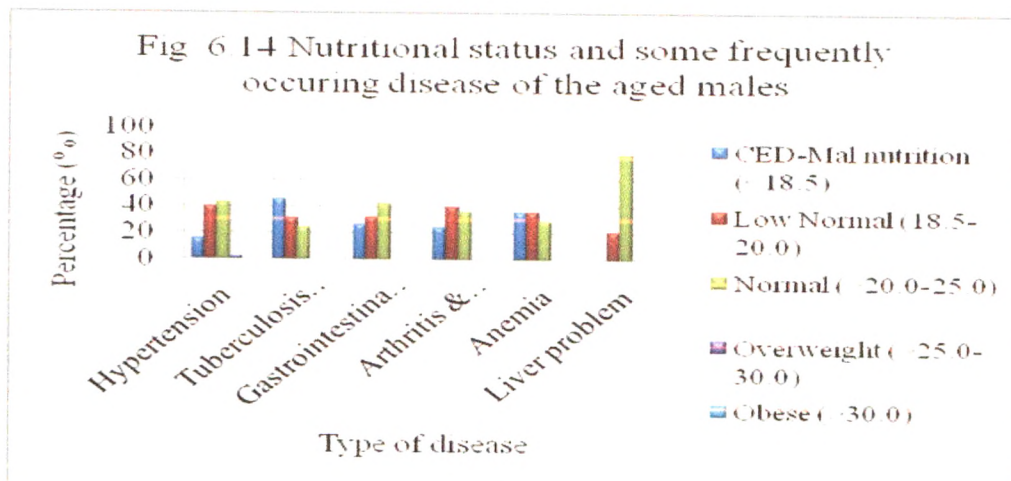

Fig. 6.13 Occupation and nutritional status of the aged females
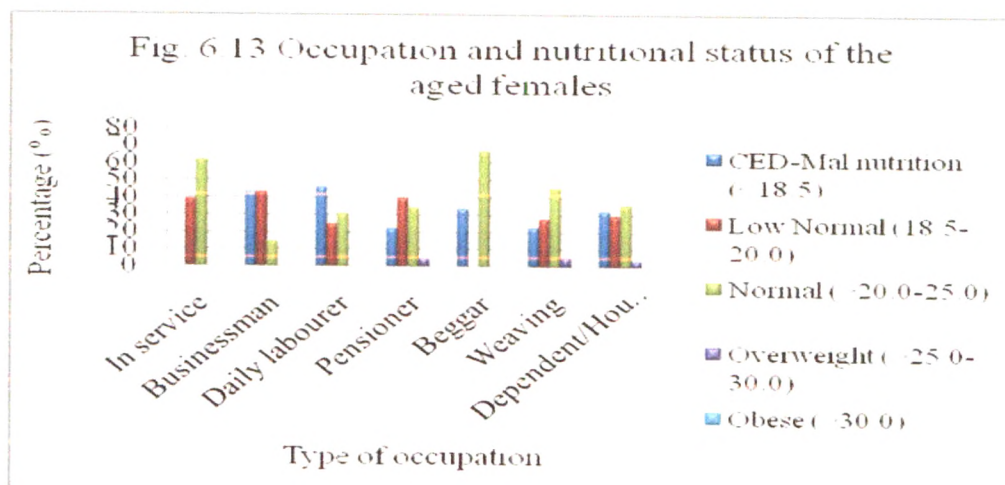
Nutritional status and some frequently occurring disease

Table 6.14

Nutritional status and some frequently occurring disease of the aged males
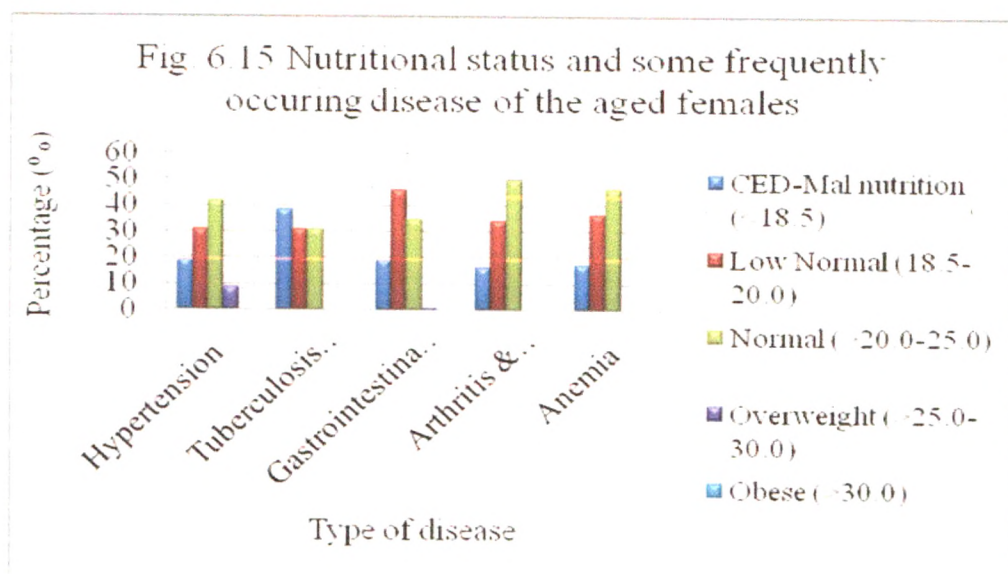
Frequently occurring disease	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
Hypertension	15(15.6)	38 (39.6)	41(42.7)	02(2.1)	-	96
Tuberculosis & asthma	30(44.8)	21(31.3)	16(23.9)	-	-	67
Gastrointestinal disorder	31(26.5)	37(31.6)	49(41.9)	-	-	117
Arthritis & body pain	24(24.0)	40(40.0)	36(36.0)	-	-	100
Anemia	11(35.5)	11(35.5)	09(29.0)	-	-	31
Liver problem	-	05(20.8)	19(79.2)	-	-	24

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Fig 6.14 Nutritional status and some frequently occurring disease of the aged males

The table 6.14 shows some frequently occurring diseases and nutritional status of the aged males. From the table it has been seen that out of 96 aged who are suffering from hypertension, 15.6% are in CED-mal nourished (<18.5) category; 39.65% are in low normal (18.5-20.0) category; 42.7% are in normal (>20.0-25.0) category and 2.1% are in over weight (>30.0) category. Out of 67 tuberculosis & asthma suffering persons, 44.8% are in CED-mal nourished category; 31.3% are in low normal category and 23.9% are in normal category. Out 117 gastrointestinal disorder persons, 26.5% are in CED-malnourished category; 31.6% are in low normal category and 41.9% are in normal category. Out of 100 arthritis & body pain suffering persons, 24.0% are in CED-malnourished category; 40.0% are in low normal category and 36.0% are in normal category. Out of 31 anemic aged persons, 35.5% are in CED-malnourished category; 35.5% are in low normal and 29.0% are in normal category. Out of 24 liver problem persons, 20.8% are in low normal category and 79.2% are in normal category.

Table 6.15
Nutritional status and some frequently occurring disease of the aged females

Frequently occurring disease	CED-Mal nutrition (<18.5)	Low Normal (18.5-20.0)	Normal (>20.0-25.0)	Overweight (>25.0-30.0)	Obese (>30.0)	Total no. of individuals
Hypertension	11(18.9)	18 (31.0)	24(41.4)	05(8.6)	-	58
Tuberculosis & asthma	16(38.1)	13(30.9)	13(30.9)	-	-	42
Gastrointestinal disorder	27(19.0)	65(45.8)	49(34.5)	01(0.7)	-	142
Arthritis & body pain	23(16.1)	49(34.3)	71(49.6)	-	-	143
Anemia	07(17.1)	15(36.6)	19(46.3)	-	-	41

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Fig 6.15 Nutritional status and some frequently occuring disease of the aged females

The table 6.15 shows some frequently occurring diseases and the nutritional status of the aged females. From the table it is found that, out of 58 aged females who are suffering from hypertension, 18.9% are in CED-Malnourished (<18.5) category; 31.0% are in low normal (18.5-20.0) category; 41.4% are in normal (>20.0-25.0) category and 8.6% are in over weight (>25.0-30.0) category. Out of 42 females suffering from tuberculosis & asthma, 38.1% are in CED-malnourished category; 30.9% are in low normal category and 30.9% are in normal category. Out of 142 aged females who are suffering from gastrointestinal disorders, 19.0% are in CED-malnourished category; 45.8% are in low normal category; 34.5% are in normal category and o.7% are in over weight category. Out of 143 females suffering from arthritis & body pain, 16.1% are in CED-malnourished category; 34.3% are in low normal category and 49.6% are in normal category. Out of 41 anemic females, 17.1% are in CED-malnourished category, 36.6% are in low normal and 46.3% are in normal category.

Waist/hip circumference ratio (Waist/hip ratio)

Waist –hip circumference ratio (WHR), waist-height ratio (WHtR) and waist circumference are commonly used to predict the risk of obesity related morbidity and mortality as they account for regional abdominal adiposity (Welborn et al, 2003, Ko GT et al, 1999, Dalton et al, 2003). Waist circumference (WC) cut-offs were taken as >90 for males and >80 for females to define overweight (WHO, 2000). The cut-off used for WHR were >0.9

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for males and >0.8 for females (Webb, 2002). For WHtR, the cut-off used was 0.5 for both sexes (Hsieh &, Muto, 2004)

The 1997 WHO Expert Consultation on Obesity recognized the importance of abdominal fat mass (referred to as abdominal, central or visceral obesity), which can vary considerably within a narrow range of total body fat and body mass index (BMI). It also highlighted the need for other indicators to complement the measurement of BMI, to identify individuals at increased risk of obesity-related morbidity due to accumulation of abdominal fat (WHO, 2000a). Waist–hip ratio (i.e. the waist circumference divided by the hip circumference) was suggested as an additional measure of body fat distribution. The ratio can be measured more precisely than skin folds, and it provides an index of both subcutaneous and intra abdominal adipose tissue (Bjorntorp, 1987). The suggestion for the use of proxy anthropometric indicators arose from a 12-year follow-up of middle-aged men, which showed that abdominal obesity (measured as waist–hip ratio) was associated with an increased risk of myocardial infarction, stroke and premature death, whereas these diseases were not associated with measures of generalized obesity such as BMI (Larsson et al., 1984). In women, BMI was associated with increased risk of these diseases; however, waist–hip ratio appeared to be a stronger independent risk factor than BMI (Lapidus et al., 1984).

Waist: hip ratio (WHR) is a ratio of waist and hip circumferences (Reddy et al 2002)

Table 6.16

Mean of waist/hip ratio of the aged males

Age group in years	Total no. of individuals	MEAN SD
55-59	120	0.97 ±0.02
60-64	50	0.96 ±0.02
65-69	30	0.97 ±0.02
70-74	20	0.98 ±0.01
75+	30	0.97± 0.01
Total	250	0.97 ±0.02

The table 6.16 shows the mean values of waist/hip ratio of the aged males. From the table it is seen that the mean value of waist/hip ratio is 0.97 (central obesity). In age wise distribution it is seen that the highest mean value is 0.98 and it is found in the 70-74 years age group and the lowest mean value is 0.96 and it is found in the 60-64 years of age group.

Table 6.17

Mean of waist/hip ratio of the aged females

| Age group in years	Total no. of individuals	MEAN SD
50-54	95	0.94 ±0.02
55-59	30	0.94 ±0.02
60-64	35	0.95 ±0.04
65-69	25	0.95± 0.02
70-74	40	0.97± 0.03
75+	25	0.97 ±0.02
Total	250	0.95± 0.03

The table 6.17 shows the mean value of the waist/hip ratio of the aged females. From the table it is seen that the mean value of waist/hip ratio is 0.95 (central obesity). The highest mean value is 0.97 and it is found in the above 70 years of age group and the lowest mean value is 0.94 and it is found in the 50-54 years and 55-59 years of age groups.

Central obesity is defined as a WHR of ≥ 0.95 in males and ≥ 0.85 in females (Reddy et al, 2002).

Table   6.18

Classification of waist/hip ratio of the aged males

Classification	Male	
	No.	%
≤ 0.95 (Normal)	235	94.0
≥ 0.95 (Central obesity)	15	6.0
Total no. of individuals	250	

Fig. 6.18 Waist hip ratio of the aged males
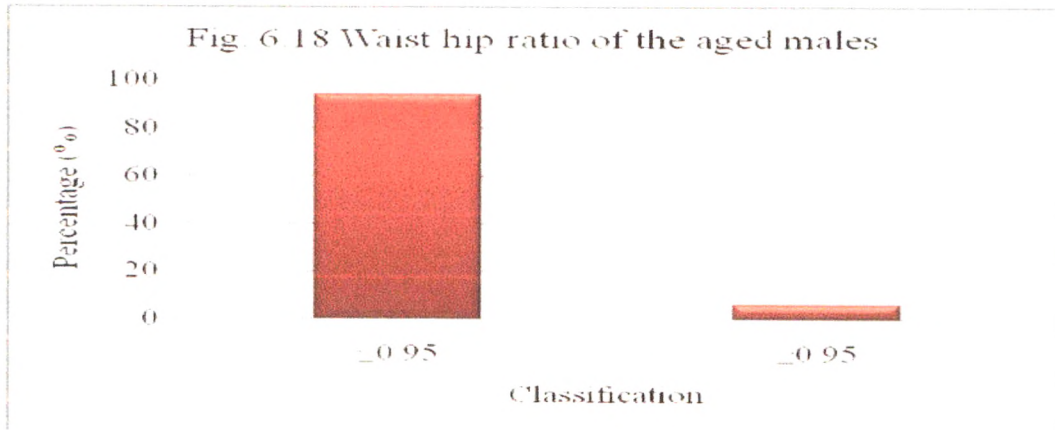
The table 6.18 shows the waist/Hip ratio of the aged males. From the table it is seen that out of 250, 94% are ≤0.95 (Normal) and 6% are ≥0.95 (Central obesity). On the other hand among the females (Table 6.19) 75.6% are ≤0.85 (Normal) and 24.4% are ≥0.85 (Central obesity).

Table 6.19

Classification of waist/hip ratio of the aged females

Classification	Female	
	No	%
≤0.85 (Normal)	189	75.6
≥0.85 (Central obesity)	61	24.4
Total no of individuals	250	

Fig. 6.19 Waist hip ratio of the aged females

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