

## Socio-demographic characteristics of the elderly males (60-80 years) affects their health and nutritional status

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■ **ABSTRACT** : A number of hundred subjects were studied through multistage random sampling, taking fifty subjects each from the two decades *i.e.* 60-70 years and 70-80 years. Nutritional Assessment was done by anthropometry, clinical investigation and dietary survey and their health was assessed using General, Physical, Mental and Social Health Measures, Multiple Chronic conditions and Nutritional Risk. Majority of the elderly males found to reside in joint family and few of them had nuclear and extended families but no subject was seen to reside alone. Maximum per cent of the subjects were Hindus and vegetarians, and belonged to Upper Socio- Economic Class, Class I and Upper Middle Class II. The mean BMI was  $23.8 \text{ kg/m}^2 \pm 5.0$  of the elderly males in 60-70 years of age and mean BMI was  $22.8 \text{ kg/m}^2 \pm 3.8$  in the age of 70-80 years. Clinical signs indicated the deficiency of vitamin C, iron and protein inspite of taking vitamins and minerals supplements. The overall consumption of cereals, pulses, roots and tubers, fruits and milk were significantly lower than the RDA, recommended by ICMR, whereas, the consumption of sugar and fat were more. The nutrient intake when estimated and compared with RDA showed that the intake of energy was more than required by the age, while protein, vitamin A, iron and zinc and fibre were lower in both the groups. The results of Socio-Demographic and health variables showed that though some of the subjects complained of poor vision, pain in back and legs and impaired hearing, they were capable of performing the activities of daily living (ADL) and instrumental activities of daily living (IADL). The distress index showed that they were mentally healthy and were not depressed as they all reported to be having good social support. The scores obtained by the subjects in Nutritional Screening Initiative Checklist reported that among the subjects of 60-70 years, 32 per cent were healthy, 42 per cent were mildly at the risk, 16 per cent were at moderate risk, while 10 per cent were severely at the nutritional and health risk. On the other hand, 24 per cent were healthy, 4 per cent were mildly at risk, 16 per cent were at moderate risk and another 16 per cent were severely at the seriousness of nutritional and health risk among the aged of 70-80 years as the data indicated that 26 per cent and 38 per cent of the subjects each decade, suffered from multiple chronic diseases. It was concluded that the elderly males aged 60-80 years, residing in Ajmer City, were at good social and mental health status, but were at the health risk due to their improper eating behaviour and unhealthy food habits.

■ **KEY WORDS** : Ageing, Old age, Elderly, Socio-demographic, IADL, ADL

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**A**geing is a developmental process, beginning at conception and ending with death. It can be defined as the biological changes that occur in the post-reproductive period. Ageing is an intrinsic characteristic that is fundamental in every individual and is accompanied by gradual slowing down of biological system, loss of vigor, and inability to withstand stress (Sehgal and Raghuvanshi, 2007).

Old age offers a gorgeous spectrum of physical signs and clinical pictures, under the domain of geriatric medicine. Although physical growth is completed by early adulthood, the body tissues and the cells remain in the dynamic state with catabolism slightly exceeding anabolism resulting in the net decrease in the number of cells (Joshi, 2002).

Ageing is not programmed nor is it inevitable. Life span

is the result of the interaction between genes and the environment in which we live (Westendorp, 2006).

People aged 60 and above are 'aged' or 'elderly' people. In India, a cut-off age of 60 years is taken for classifying people as 'old' and is used for census purposes. Many nations follow the cut-off age at 60 years while many developed countries and United Nations take the cut-off age at 65 years to designate the elderly.

This is the last stage of life. If the early years have been fulfilling, the older adults arrives at this phase equipped to face the problems that this age poses. If on the other hand, there is no sense of completeness it torments the old person. He feels unneeded and unwanted. Many families in our country are closely knit. The old in such homes have a sense of belongingness, and are an essential part of the family. Such old people in turn try to enrich to lives of others and such relationships are mutually rewarding (Joshi, 2002).

Management of the elderly is now a challenging task for the medical profession, nutritionists, administration and society. As, increased longevity is at present times, a worldwide phenomenon (Bound *et al.*, 2010). In India too, the enhanced quality of health care facilities, availability of life saving drugs and improved standard of living since Independence have helped in a big way to increase the life span of its population.

The census report of 2001 points to the significant demographic characteristic of an increase, in the number and proportion of the aged. Projected percentage increase in population aged 65 and above, between 1994 – 2000 in India was 130 per cent, *i.e.* from 57 million in 1991; the aged population has risen to 82 million by year 2000. By the year 2020, worldwide there will be 1000 million aged persons above 65 years of which 177 million will reside in India. (Sehgal and Raghuvanshi, 2007).

This prospect raises a variety of challenges for us to ensure that these additional years are enjoyable, productive and healthful, keeping people healthy, as they get older.

Thus nutrition research is shifted from focusing exclusively on alleviating nutrient deficiencies to also stressing chronic disease prevention. On going initiative to optimize long- term health and promote healthy aging are based on the concept of functional fitness, *i.e.* the ability to lead an active and healthy life (Kennedy, 2009 and Dwyer, 2006).

Hence, this piece of research work was planned and designed to assess the nutritional status, identifying the socio-demographic characteristics of household, examine the general, physical, mental and social health, to find out the prevalence of certain selected chronic health conditions, to conduct a Dietary Survey and to evaluate elderly for nutritional risk.

## ■ RESEARCH METHODS

### Selection of the samples:

A total of twenty localities of the Ajmer city were selected

for the study. From each locality, five samples were selected through random chit method. A total number of hundred samples were selected, by taking twenty five samples each, form each zone. The subjects were further divided into two broad categories according to their ages: Younger Old (60-80 yrs) and Older Old (70-80 yrs) taking 50 subjects in each category, respectively. Information about the subjects pertaining to age, education, occupation, marital status, and composition of the family, its type and living arrangements and economic status was obtained. The anthropometric measurements employed were: height, body weight, Skinfold at triceps, mid upper arm circumference (MUAC) and Body Mass Index (BMI). Clinical Examination (Jellife, 1966) and Dietary survey regarding the food and nutrient intake were also obtained (Gopalan *et al.*, 1971) (ICMR, 2011).

### Sociodemographic and health variable:

Socio-demographic variables measured were household types was defined as single person, single parent with children, couple without children, or other household arrangements.

Three variables were used to describe the material circumstances of the household, employment, welfare/unemployment, insurance\compensations.

Multiple measures of health were assessed for each participant. General health and physical, mental and social dimension of health were assessed through self –rated health scale, a functional health index (Torrance *et al.*, 1996), restricted activity status (Lawton, 1994), number of chronic conditions, a depression index, a distress index and a social support index. (Wade, 1997).

### Multiple chronic conditions:

Respondents were asked if they had chronic conditions that had lasted or were expected to last more than six months and that had been diagnosed by a health professional. The respondents were considered to have multiple chronic conditions if they report to have at least three (Che, 2001).

### Nutritional risk:

A Nutritional screening initiative checklist (NSIC) defines the risk factor as “a characteristic or occurrence that increases the likelihood that an individual has or will have problems with Nutritional Status.” The checklist is intended to serve two purposes, first to provide people with basic nutrition information regarding the characteristics that may increase the likelihood of poor nutritional status. The second is to encourage the public to talk with health and social services providers about their nutritional concerns.

Each item has its own weight score, depending on the attributed seriousness to nutritional and health risk in the elderly (ADA, 1991).

## ■ RESEARCH FINDINGS AND DISCUSSION

The findings obtained from the present study have been

discussed under the following sub-heads:

#### General information:

The General Information of the Subjects obtained is presented in Table 1. The data gathered regarding the socio economic status of the subjects classified them mainly in the upper three classes of the income group (Table 2).

Assessment of the Nutritional Status revealed the fact that the subjects of both the age categories were mainly normal in health regarding their growth as indicated in Table 3.

#### Clinical examination:

The observation revealed that the most common problem faced by the elderly in both the age groups was of bleeding gums, 30 per cent and 46 per cent, respectively, among 60-70 years and 70-80 years. The other clinical signs observed in males of 60-70 yrs., were thinness or sparseness of hair 10 per

cent, easy pluck ability of hair 18 per cent, pale conjunctiva 26 per cent, swollen gums 10 per cent, dental cavities 34 per cent, rough and dry skin 14 per cent, spoon shaped nails 4 per cent, ridged nails 4 per cent and edema in feet 8 per cent.

In the subjects of age 70-80 yrs., the problem of thinness or sparseness of hair was observed in 4 per cent, pale conjunctiva 34 per cent, swollen gums 16 per cent, dental cavities 10 per cent, rough and dry skin 6 per cent and edema was 6 per cent.

All these clinical signs observed, indicate that these elderly males in both the decades were suffering mainly from the deficiency of vitamin C, iron and protein (Jelliffe, 1966).

#### Dietary survey:

##### General dietary habits:

The percentage of 70 and 84 subjects in both the age groups, respectively, were in the habit of taking minerals

**Table 1 : General information of the subjects**

Characteristics		Age			
		60-70 yrs (n=50)		70-80 yrs (n=50)	
		No.	%	No.	%
Type of the family	Nuclear	16	32	12	24
	Joint	28	56	34	68
	Extended	6	12	4	8
Marital status	Unmarried	-	-	-	-
	Married	42	84	46	92
	Widows	8	16	4	8
	Divorcee	-	-	-	-
Household type	Single person	-	-	1	2
	Single person with children	8	16	4	8
	Couples without children	6	12	4	8
	Couples with children	32	64	39	78
	Other arrangement	4	8	2	4
Religion	Hindu	44	88	46	92
	Muslim	2	4	-	-
	Sikh	4	8	2	4
	Christian	-	-	2	4
	Others	-	-	-	-
Eating habits	Vegetarian	30	60	36	72
	Non-vegetarian	8	16	6	12
	Ova-vegetation	12	24	8	16

**Table 2 : Classification of subjects by social class**

Characteristics	Age			
	60-70 yrs (n=50)		70-80 yrs (n=50)	
	No.	%	No.	%
Upper class I	16	32	15	30
Upper middle II	8	16	9	18
Middle middle III	17	34	21	42
Lower middle IV	3	6	3	6
Lower class V	6	12	2	4

Note:- Classification given by B. Kuppuswamy was used (modified)

**Table 3 : Anthropometric studies of the subjects**

	Age					
	60-70 yrs (n=50)			70-80 yrs (n=50)		
	Mean	S.D.	S.E.	Mean	S.D.	S.E.
Age (yrs)	64.72			78.61		
Height (cms)	162.63	5.68	0.80	163.42	5.21	0.74
Weight (kgs)	62.86	13.12	1.86	61.90	6.72	0.95
MUAC (cms)	22.54	0.50	0.07	23.80	0.34	0.05
TSF (mm)	26.64	3.31	0.47	26.71	2.56	0.36
BMI (kg/m <sup>2</sup> )	23.81	5.05	0.71	22.84	3.86	0.55

Note:- S.D.= Standard Deviation and S.E.= Standard Error

and vitamins supplements.

Regarding the habit of eating at regular meal time, amongst the males of 60-70 yrs., only 48 per cent and 74 per cent amongst 70-80 years were eating 3 meals at regular meal time.

Information was also collected to know whether the subject had changed their food pattern or not, the positive response was found in 54 per cent and 66 per cent of the males, respectively in both the age groups.

Consumption of the tea was found to be in both the groups when compared to the consumption of coffee; *i.e.* 74 per cent and 82 per cent and 10 per cent and 4 per cent, respectively.

To have a look about how the subjects consider their diet to be, they were asked whether they find their diet to be well balanced, repetitive, unbalanced or generally poor; the responses were 46 per cent, 26 per cent and 8 per cent, respectively, among the elderly between 60-70 yrs., and 38 per cent, 46 per cent and 14 per cent, respectively, among the elderly between 70-80 yrs. No respondent considered their diet to be generally poor.

About 58 per cent and 44 per cent of the subjects in both the category feel that their lifestyles have a negative effect on the diet, the reason given was, lack of time, money and improper health.

#### Common food items avoided:

It was found that amongst the subjects belonging to the age of 60-70 years, about 24 per cent avoided milk, 18 per cent avoided Paneer, 5 per cent avoided curd and 42 per cent avoided cheese due to money, taste and health.

Amongst the cereals, bajra was avoided by 14 per cent, maize 22 per cent, jowar 54 per cent, the main reason behind them for not consuming was basically lack of time and taste.

Health was the only reason to avoid the consumption of rice in 18 per cent and bread in 14 per cent of the subjects, whereas regarding the pulses, the most commonly avoided amongst them was moong 6 per cent, moth 26 per cent and lobia 24 per cent, the common reason given was its unpleasing taste. And for chana (10%), rajma (26%), and soyabean (58%), money time and taste were the basic reasons.

Amongst the leafy vegetables, palak was generally not eaten by 6 per cent, methi by 14 per cent, bathua 38 per cent and sarson by 34 per cent of the subjects. The reasons behind these were that they are time consuming 10 per cent, not good to taste 18 per cent whereas, 6 per cent gave other reasons.

The basic reason behind the avoidance of fruits was found to be money, for citrus fruits 8 per cent, pomegranate 6 per cent and mango 18 per cent. Second reason was health for fruits like mango 4 per cent, banana 10 per cent, and sapota 14 per cent. Papaya was disliked mainly due to its taste by 12 per cent.

Dry fruits were not consumed by the subjects mainly due to money 10 per cent and health 4 per cent.

Health reasons, basically diabetes and obesity, restrained some subjects for not consuming sugar 10 per cent, gur 14 per cent, honey 4 per cent and sago 8 per cent.

Lastly, 22 per cent avoided the use of ghee, soyabean oil 14 per cent, groundnut oil 8 per cent and butter 26 per cent mainly because of money and health, whereas mustard oil was disliked because of its taste by 26 per cent of the subjects.

Regarding the second decade of the subjects *i.e.* 70-80 years, milk was disliked by 8 per cent, paneer by 22 per cent, the main reason being money 10 per cent, taste 14 per cent, and 6 per cent for some other reasons. curd was avoided by 10 per cent of the subjects due to their health while chees and khoa was avoided due to money and taste, 54 per cent and 46 per cent, respectively.

The subjects in the second decade too avoided bajra 50 per cent, maize 64 per cent, jowar 74 per cent and rice 22 per cent but the reason here was mainly health 30 per cent, 20 per cent and 22 per cent, respectively. In addition to the lack of time 26 per cent, 34 per cent and 14 per cent, respectively.

Bread, maida, and Dalia were also disliked due to their taste by 18 per cent, 34 per cent and 14 per cent of the elderly, respectively.

Amongst pulses, moong 10 per cent, moth 14 per cent, and lobia 32 per cent, were disliked for their taste. Whereas chana, rajma and soyabean were not consumed due to increased cost, lack of time for their preparation, and health reasons by 42 per cent, 54 per cent and 70 per cent of the elderly males.

Regarding the green leafy vegetables, the same leafy vegetables were disliked by the subjects of the second decade as by the subjects of first decade for the given same reasons *i.e.*, of taste.

Fruits which were mainly avoided by this age group of elderly males was because of their health, were citrus fruits 26 per cent, pomegranate 58 per cent, mango 14 per cent, banana 26 per cent and sapota 18 per cent and papaya 8 per cent was disliked due to its taste.

Fifty six per cent of the aged 70-87 years avoided the consumption of dry fruits, the reason given was money 14 per cent, health 30 per cent, and taste 10 per cent. Diabetes and obesity, were the reason behind not consuming sugar and its products given by 44 per cent of the subjects.

Ghee was not consumed by 38 per cent, due to money 6 per cent, health 24 per cent and 8 per cent for other reasons, whereas, mustard oil was not consumed due to its taste by 42 per cent, soyabean oil and butter were avoided basically due to money, health and taste by 10 per cent and 14 per cent of the subjects, respectively.

#### Food intake:

It was found that the consumption of cereals was (90.0) per cent, roots (70.0) %, other vegetables (120.0)%, fruits (60.0)% and milk (73.3)% of the RDA where as the consumption of the other vegetables among the elderly belonging to 60-70 years of age, was (120.0%) higher than the RDA.

On the other hand, the consumption of cereals (74.2)%, pulses (70.0%), fruits (45.0 %) and other vegetables (52.5%) were found to be very low amongst the elderly of 70-80 years

when compared to the RDA. And consumption of fats (128.0 and 120.0%) and sugar (175.0% and 150.0%) were little more than the RDA among both the groups.

#### Nutrient intake:

The mean energy intake of the subjects in both the groups was 2219.6 K.cal and 1816.2 K.cal, being 112.6 per cent and 115.6 per cent of the RDA, respectively.

The Protein intake was lower than the RDA in both the group being 80.1 per cent and 72.1 per cent. The protein intake was found to be low, may be due to lesser consumption of milk and pulses by both the groups, than recommended.

Amongst vitamins and minerals, the intake of Vitamin A (retinol) lower in both the groups, *i.e.*, 31.9 per cent and 53.0 per cent, respectively, may be due to less consumption of milk and because majority of the subjects were vegetarians.

Intake of iron and zinc were significantly low being only 67.8 per cent and 55.2 per cent of the RDA in 60-70 years and 47.7 per cent and 40.0 per cent of RDA amongst 70-80 years, respectively, as the result of lesser consumption of vegetables and fruits by both the groups. This may be one of the reasons of subjects being anemic giving the complaints of restlessness and lethargy.

The consumption of other vitamins and minerals was comparatively normal of the RDA. However, the intake of important nutrient for this age *i.e.*, fibre was found to be very much lower than required, by both the groups (*i.e.* 42.0% and 43.0%) as the diet lacked in vegetables and the whole grain pulses and cereals, this is why many of the elderly males complained of gastric upsets and constipation.

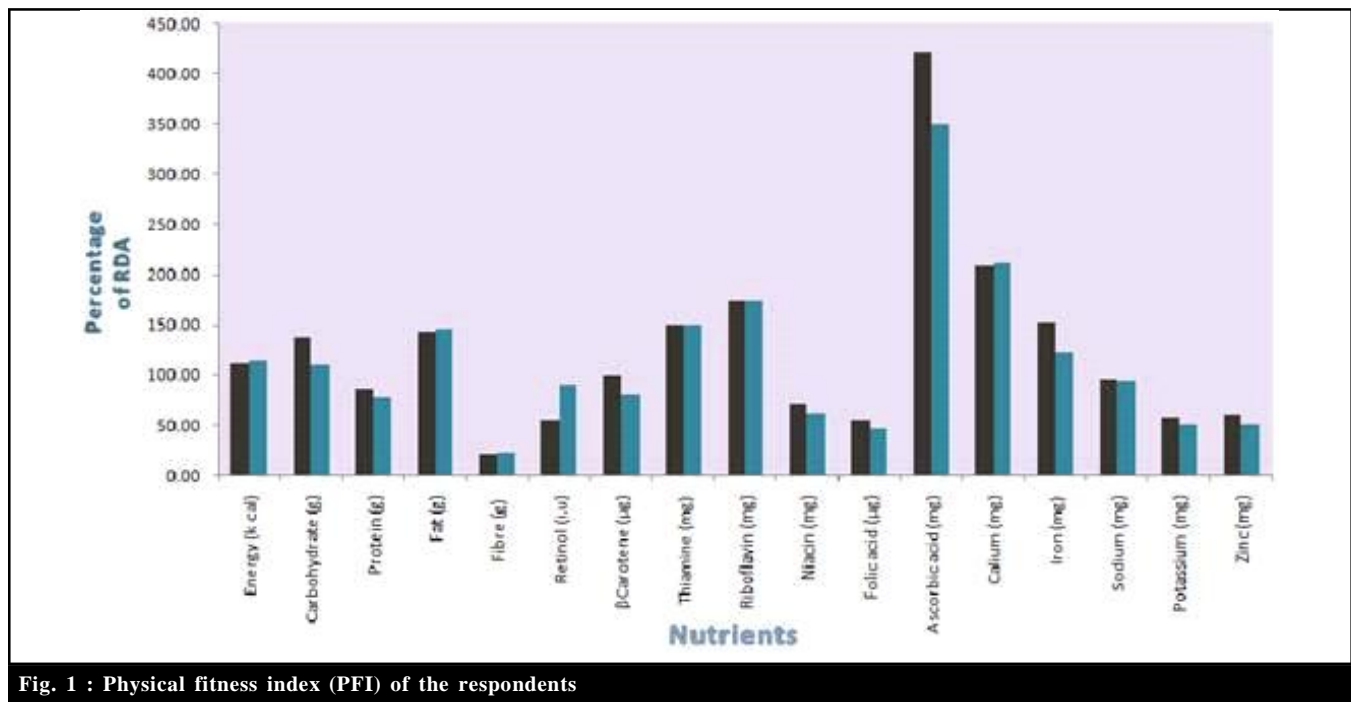


Fig. 1 : Physical fitness index (PFI) of the respondents

Energy per cent was also calculated to find the total calories contributed by the carbohydrate, protein and fat in the diet. The result revealed that the energy per cent of the carbohydrate, protein and fat among 60-70 years elderly males was 75 per cent, 7.9 per cent and 60.4 per cent, respectively. And that in the age group of 70-80 years it was 61 per cent from carbohydrate, 7.2 per cent from protein and 34.9 per cent from fat (Fig. 1).

### **Socio – demographic and health variables:**

#### *General health measures:*

General Health of the subjects was measured through self – rated health scale and a functional health index.

According to the self rated health scale about 54 per cent of the subjects in the age of 60-70 years and 46 per cent of the subjects in the age of 70-80 years rated their health as very good. Another 28 per cent and 40 per cent rated themselves as good in both the categories, respectively, whereas, 18 per cent and 14 per cent of the subjects in both the categories think that their health status is fair. But no single subject rated their health status as poor nor excellent.

Assessing the subjects for their functional health, about 18 per cent and 26 per cent of the subjects in both the groups complained of poor vision, and only 4 per cent and 10 per cent had problem in hearing, respectively. Twenty two per cent suffered from chronic pain in legs, 18 per cent had back pain and 45 complained of having pain in entire body in the age group of 60-70 years. On the other hand, the subjects falling in the second decade *i.e.*, 70-80 years, 34 per cent were suffering from leg pain, 26 per cent had pain in their back and 10 per cent had pain in their entire body. About 6 per cent of the subjects also complained of pain in hands and 2 per cent had problem in cognition in this category.

#### *Physical health measures:*

The results of Instrumental Activity of Daily Living (IADL) showed that 92 per cent and 78 per cent of the subjects, respectively were able to prepare their own meal. Ninety six per cent and 86 per cent were able to drive the car, 94 per cent and 90 per cent of the elderly in both the categories were comfortable in using the public transport. Ninety four per cent and 74 per cent of the subjects agreed that they can perform light household activities. Ninety Six per cent of the subjects found to be capable of managing money and taking their own medicines, whereas, 10 per cent and 14 per cent of the subjects in the age group of 70-80 years denied that they face difficulty in managing their money and taking their own medicines, respectively.

When the subjects were asked for their performances of Activities of Daily Living (ADL), the responses were found to be more positive, as, 96 per cent and 90 per cent were able to dress themselves, 100 per cent and 98 per cent of the subjects can feed themselves, 92 per cent and 78 per cent can

comfortably sit in chair and bed, 96 per cent and 84 per cent of the aged were able to take their own bath and go to toilet, in both the age categories, respectively.

### **Mental health measures:**

Mental health status was judged by the subjects' state of depression and distress. The state of major depression was assessed by using a brief questionnaire (UM-CIDI-SF). Amongst the elderly belonging to the age of 60-70 years, 10 per cent responded that they experience depression most of the day, and 4 per cent had depression from the period of two weeks. But majority of the subjects *i.e.*, 86 per cent did not experience any kind of depression.

The responses of the elderly of 70-80 years were found to be that 14 per cent had depression nearly most of the day, 2 per cent have almost everyday and 6 per cent experienced from the period of two weeks and 78 per cent did not have any kind of major depression.

Further, the subjects who reported to be in the state of depression were further judged to find the level of distress through distress index. According to this distress index the different feelings of distress were found to be sadness in 22 per cent, nervous and fidgety in 16 per cent in the elderly falling in the age group of 60-70 years.

While on the other hand, in the elderly of 70-80 years, the feeling of sadness was in 40 per cent, nervous and fidgety 38 per cent and worthlessness 6 per cent.

About 4 per cent of the subjects amongst 60-70 years were in the state of distress, 6 per cent were sad but 90 per cent of them were healthy. Similarly, only 14 per cent were in the state of distress, 16 per cent were sad but 70 per cent of the subjects amongst 70-80 years were healthy as by the scores obtained in the distress index.

### **Social health measures:**

It was found that nearly 90 per cent of the respondents in the age group of 60-70 years had good social support, whereas only 10 per cent had poor social support. Similarly, 82 per cent had good social support and 18 per cent reported to have poor social amongst the elderly of 70-80 years. But on the whole out of all the subjects no one was found to be residing all alone.

### **Multiple chronic conditions:**

According to these reports it was analysed that 26 per cent of the subjects in the age group of 60-70 yrs and 38 per cent of the subjects in the age group of 70-80 yrs were suffering from multiple chronic diseases as they complained of suffering from three or more diseases together. This calls for paying great attention to the health of the elderly (Fig. 2).

### **Nutritional risk :**

According to the Self Rated Nutritional Health Risk Scale,

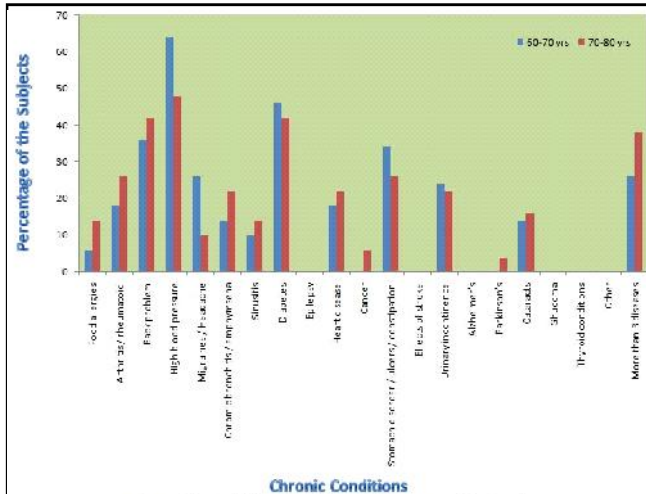


Fig. 2 : Multiple chronic conditions past six months

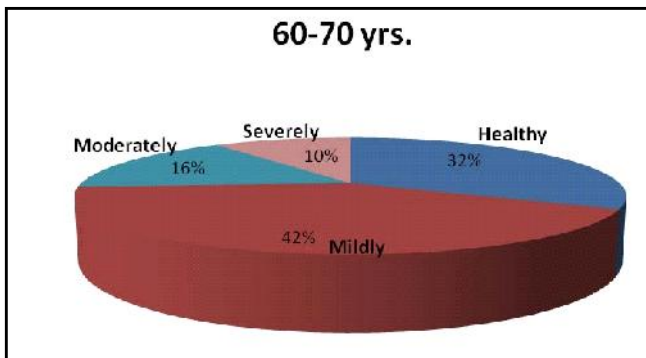


Fig. 3 : Percentage of subjects at nutritional risk

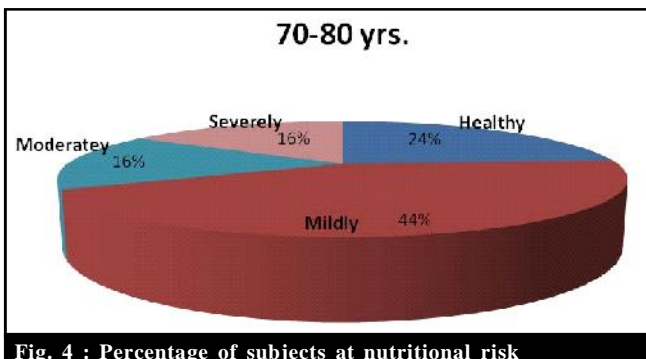


Fig. 4 : Percentage of subjects at nutritional risk

by the subjects, the results obtained were as follows (Fig. 3 and 4).

**Suggestion:**

Some of the dietary cares are mentioned below that will benefit the elderly tremendously.

- Appetite among the elderly should be promoted. We

must take into account factors, like taste, odour, texture, colour of foods, and the colour, size, shape of tableware and dishes which help to uplift their depression and also increase appetite.

- The elderly must take adequate quantity of fluids as both intracellular and extracellular water are reduced.

- In order not to suffer from constipation, the elderly people should take foods high in water or fibre. The elderly person’s diet should have minimally processed cereal food and higher amounts of fruits and vegetables for the treatment of constipation. The elderly may develop deficiency of fat-soluble vitamins due to habitual use of laxatives that contain mineral oil, which interferes with absorption.

- Immunocompetence of the elderly should be maintained at maximum level through adequate intake of micronutrients particularly of iron, zinc and vitamin C either from dietary supplements or medicinal dose.

- The aged people should be advised to remain physically active. Sedentarism is harmful as it initiates body protein loss and invites stiffness, fatigue, weakness, incoordination and instability of the body.

- Loss of teeth due to increase decay of teeth and gums is common in aged person. III fitting dentures may also make chewing difficult. A change in the texture and method of food preparation is recommended. Consequently, well-cooled and soft meals must be included in the diet. Care must be taken to avoid too much of soft carbohydrate-rich foods and include foods that provide nutrients such as vitamins, proteins and minerals like calcium.

- There is decreased secretion of saliva, which makes swallowing difficult. Therefore, soups vegetables with gravies, curds or raitas, dals should be included in the meals and very dry meals should be avoided.

- Protective foods (fruits/vegetables) must be included in the diet of elderly. Every effort must be made in order to incorporate these in the daily diet.

- Impaired absorption of iron and calcium may occur because of hypochlorhydria (decreased stomach acidity). This may lead to anemia and may contribute to osteoporosis. Iron and calcium-rich foodstuff should be included in the daily dietary intake.

- The energy intake should be sufficient to maintain normal weight without leading to obesity or weight loss. Undernutrition is undesirable and obesity may predispose an elderly person to diabetes, coronary heart disease, gout and other degenerative disorders.

- Small meals at frequent intervals should be consumed. Fats, oils, refined cereals and sweets should be consumed by the elderly, Dietary fat, if poorly tolerated may be reduced.

- Elderly need more calcium, iron, zinc, antioxidant nutrients (B-carotene, vitamin E and C) to prevent age-related diseases. Inadequate diets of the elderly may need to be supplemented with pharmaceutical nutritional supplements.

- The likes, dislike and food preferences of the elderly should be considered while meal planning.
- Among elderly who suffer from chronic diseases like diabetes, hypertension or heart disease, further dietary modifications may be required.
- Alcohol consumption and cigarette smoking should be avoided. (Munro and Schierf, 1992).

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