

INTRODUCTION

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Population ageing is a global issue, which has been recognized to have implications on the health care and social welfare systems. These issues demand action oriented research programs in developing nations where such initiatives and societal database information about elderly class of population are scanty.

Demographers have already warned that the population structure is transiting from pyramid to pillar. Very soon (by 2025), 10% of the total population in India will be of the age 60yrs and above. By 2001, it has risen from 5% to 7% (since independence) in both men and women. According to Sial (1999), the 'grey' population is getting more mature. Ten percent of the population over 60 years of age is in the age bracket of 80 years and this will rise to 25% by the year 2050. Expectation of life at birth for males and females has increased more in recent years. In India, it is projected to be 67years by 2011-16 for males and 69 years for females. Projections beyond 2016 made by United Nations as per the sex and age distribution of population, has indicated that 21 % of the Indian population will be 60+ by 2050 which was 6.8% in 1991 (Bose and Shankerdass, 2001).

Demographic transition has been accompanied by changes in society and economy (Census of India, 2001). Instead of strong family ties in India, status of a large number of elderly have become vulnerable to family neglect.

National Family Health Survey-II (NFHS) data reviewed by Radkar and Kaulagekar (2006) on living conditions of elderly in India shows that 3% of elderly were living alone and 9% had someone to care for them. Those living alone, living in rural areas and 88% who were widowed, divorced/separated were living a low standard of living. Special attention to elderly women staying alone without much support and strength was strongly suggested.

Living arrangements of the elderly are influenced by factors which include type of residence, family composition, marital status, geographical distance between parents and children, quality of housing, home ownership and satisfaction of psychological, physical and economic needs.

Data available on health and nutritional status of elderly women with different living arrangements is scarce. Present study was planned therefore with a view to explore problems of food related activities among elderly women with different living arrangements and belonging to different age groups. Further, assessment of their diet, nutrition and disease profile was also carried out.

There are many social factors, which include industrialization, urbanization, education and exposure to western life styles that bring changes in values and life style. Economical factors like higher costs of bringing up and educating children and pressure of sharing income for the care of parents also play a negative role in quality life of the elderly. Migrant children also prefer to leave their parents in their native places due to shortage of space in urban areas with higher rents.

Ageing also has a gender perspective. In many countries women are less educated, economically dependent, unemployed and have lesser access to health care and nutrition (Nampudakam, 1999). Since women tend to outlive men because of genetic reasons and are younger to their spouses, their nutritional status is greatly affected by the combined effect of social, physical and psychological factors that in some way or other lead to anorexia or lack of interest in food leading to various morbidities including more limitations in self care. Women have greater life expectancy and they also compromise on self-care. This alarming rise in conjunction with post retirement and multiple morbidity problems in the elderly warrants careful planning of their total care at all levels and at all stages of their life. Present study therefore was focused on health and nutritional aspects of women in particular.

The transition from adulthood to old age is often perceived as a process of loss of physical and psychological health status. Health needs and problems of the elderly are many and varied. With advancing age there is a reduced vitality and increased vulnerability to common diseases both acute and chronic. The social changes that accompany urbanization are likely to increase nutritional risk for this age group. Despite lower energy intakes with age, elderly have higher requirements for several micronutrients, making them vulnerable to deficiencies that further aggravate chronic conditions.

The fastest growing segment of the population in most industrialized countries is the elderly and too often this is also a group most susceptible to many health risks from a nutrient poor diet. Evidence from numerous sources indicate that a significant number of elderly fail to get the amounts and types of food necessary to meet essential energy and nutrient needs. There are a wide range of reasons why older individuals might not be eating the most nutritious diet which is all the more reason why health professionals and care providers need to be constantly aware of the necessity for maintaining an optimal nutritional health status in the elderly. Physiological, psychological and economical changes in the later years can all contribute to poor nutrition among the elderly, and accordingly establishment of healthy nutritional habits often requires a multifaceted intervention approach to address the wide range of factors contributing to sub optimal nutrient intakes (Dhar, 2005).

Gambhir et al., (1996) studied free living elderly subjects from middle income group and reported that though protein, calcium and vitamin A intakes were comparatively higher, a significant decline in energy, iron, thiamine and β -carotene intakes were found with increase in age.

After fifty years of age there are many metabolic and physiological changes, which show an impact on the nutritional needs of an individual. The metabolic rate slows and can decline as much as thirty percent over a lifetime. This results in decreased caloric needs, which can be complicated by changes in an older person's ability to balance food intake and energy needs. Even with a decreased caloric need, many older people have difficulty getting sufficient calories, which can eventually lead to chronic fatigue, depression, and a weakened immune system. Decreased physical activity and altered metabolism with ageing fail to adequately regulate food intake and develop a physiological anorexia of ageing (Morley, 1997).

With ageing the body composition changes with a decrease in lean tissue mass (as much as 25%) and an increase in body fat. Such changes can be accelerated because older adults utilize dietary protein less efficiently and may actually need a greater than recommended amount of high quality protein in their diet to maintain

lean tissue mass. These changes in metabolism and physiology can be exaggerated due to complications from digestive difficulties, oral and dental problems, and medication-related eating and nutrient problems.

While there are many physical and clinical factors that can contribute to under nutrition in the elderly, there are as many equally important social and economic factors, which can further complicate the nutritional well-being of an older individual. Contributing factors include loneliness, lack of cooking skills, depression, economic concerns, weakness and fatigue, and, in too many cases, an unwarranted fear of many high quality, nutrient dense, affordable foods. All these factors can contribute to the fact that a significant number of older men and women consume less food than required to meet energy and nutrient requirements, and are at moderate to high nutritional deficiency risk.

Arthritis makes it difficult for the elderly living alone to shop for and prepare food. A decreased ability to taste and smell can also affect the enjoyment of food. For the elderly, poor dentition, loss of teeth and poorly fitted dentures can cause chewing problems and mouth sores, making eating process difficult.

Those living alone and who face financial difficulties tend to skip on food, and may cook only one dish a day to be eaten over breakfast, lunch and dinner. Many elderly men neglect their nutrition because they lack the cooking skills and knowledge about nutrition (especially after the death of the spouse), suffer from problems such as loneliness and depression, or weakness and fatigue. Others consume too much deep-fried, oily food instead of more nutrient-dense foods like fruit, vegetables and whole grains (Health Promotion Board, 2005). Considering these facts, the present study was aimed at analyzing the impact of living arrangements on health of elderly women.

Another possible factor is lack of knowledge. In many societies, men, particularly may not have knowledge of food preparation and are therefore compromising a lot on proper dietary intake, ultimately they are most at risk.

In a study reported earlier by Mehta (1999), diminished food intake, depression and negative thoughts were also seen more in the institutionalized elderly as compared to the elderly living with family.

The nutritional risk of the elderly is no doubt affected by the fact that the low-fat, low-cholesterol diet message has been heard loud and clear by this population. Many elderly readily accept the fear of consuming high fat and cholesterol diet because of their heightened concern regarding their own health, and the knowledge that the risk for chronic diseases increases with age. While dietary limits on fat and cholesterol consumption are widely assumed to be effective risk-reduction interventions in young and middle-aged adults, the appropriateness of such dietary restrictions in older individuals has become an area of considerable debate.

Good nutrition is ageless and the message to older people must be that the quality of their nutrition is basic to the quality of their life. While the evidence of the value of nutritional balance is clear, the nutritional status of many older individuals lack that balance and the problem is often complicated by over-emphasis on single nutrient issues. For e.g. we should look at the relative benefits of cardiovascular risk reduction with dietary restrictions versus the potential risks to the nutritional well-being of the elderly when these interventions often result in reductions in many nutrient dense foods. The real question that must be addressed is whether the "one diet fits all" approach readily fits both the nutritional needs and health concerns of the elderly.

In too many cases it is simply easy for the elderly individual to reduce consumption of the many valuable nutrients found in abundance in the food groups they have been advised to restrict or in some cases actually eliminate. Repatterning dietary choices in an elderly individual can result in elimination of major food groups from the diet without any real nutritional benefit, and with some nutritional risk. It is for reason such as this that it is essential that the impact of dietary modifications on the overall quality of the diets of elders be carefully evaluated. It has been recommended that dietary modifications for older adults not be overly restrictive and that the major emphasis should be on dietary needs to address immediate problems

such as diabetes, food allergies and renal problems. Nutrition advice for older adults should be designed to respond to the changing physiological, psychological, social and economic capabilities of the individual while assuring that the overall nutritional needs are met with the freedom to eat meals and eating an important aspect to the quality of life during the later years.

Malnutrition among the elderly is a growing problem. According to the U.S. Conference of Mayors' Status Report (1997) on Hunger and Homelessness, requests for food assistance by elderly persons increased by an average of nine percent during the past year.

Gee et. al., (1996) carried out a study on 200 low-income group elderly women of Nairobi to assess their nutritional status. The results showed that these women were susceptible to the risk of developing protein-energy malnutrition.

Yadav et. al., (2003) carried out a study on 96 older adults with mean age 66.2 years. They found that there was an age factor for dietary inadequacy and decreased level of serum Vitamin E in geriatric group.

Mehta and Mehta (2003) assessed the impact of cultural food beliefs and practices on the nutritional status of elderly from Hindu, Jain and Muslim community. Data showed that elderly women from Jain community had significantly lower intake of β carotene and iron, whereas intake of energy, protein and calcium was significantly higher in Muslim elderly subjects compared to other two communities ($p < 0.05$).

Studies on diet, nutrition and health profile of free living and hospitalized elderly subjects were also carried out by Mehta et. al., (1996) in the department of Foods and Nutrition, The M.S. University of Baroda. In these studies, ageing per se showed distinct differences in food preferences, dietary intake, nutritional status and disease profile from decade to decade while showing gross dietary inadequacy in geriatric men and women.

Tillburg (1996) showed that those with good social support had much less morbidity than those who were coping with problems, personally themselves. This clearly

emphasized that the health standard of aged could be very much improved if minimum desirable conditions were created.

As discussed earlier, living arrangements are a key dimension of quality of life and well being in old age. Availability of family care, as well as social and economic support, is in part a function of which you live with.

Thus, the problem causing malnutrition among the elderly include: physical incapacity to obtain and/or prepare food, cognitive problems, medical conditions requiring dietary changes, poor dental health (badly fitting dentures can make it painful and difficult to eat), trouble in chewing and/or swallowing, loss of the sense of smell or taste makes food unattractive, an unrecognized infection in the urinary tract can make people feel too ill to want to eat. Bowel problems such as severe constipation cause pain and make people unwilling to eat. Due to high consumption of alcohol, social isolation and /or depression, older people may fail to recognize when they are thirsty and even certain problems with their mobility can stop them getting themselves a drink leading to dehydration at a longer period of time. Dehydration is a common risk in older people and a dry mouth makes food hard to chew or swallow. Therefore ideally water or a drink should always be served with their meals. Digesting solid food takes a lot of energy, so the act of eating a meal can be tiring to a frail person. Recent life events such as bereavement, or an unwanted move to a new place to live, or loss of contact with friends can diminish appetite due to grief. Many people lose interest in food when they no longer have someone with whom to share their meals, use of multiple medications, advanced age (80+) and malnutrition has serious negative health consequences for seniors. The progressive effects of malnutrition in elderly people include: loss of muscle mass, weakness and fatigue, impaired immune response, poor wound healing, impaired organ function, infection, sepsis and without nutritional intervention, death. Given below in table 1.1 are the contributory factors responsible for nutritional problems in elderly people.

Shringarpure (2004) studied 166 men (mean age 62 years) and 70 (mean age 58 years) women aged 45 years and above and found that oral cavity and

gastrointestinal tract problems were higher among all the subjects, whereas locomotor problems were more prevalent in elderly women especially selected for the study.

Mehta et. al., (1997) has also shown similar occurrence of problems among elderly men and women.

Ray (2005) studied thirst, fluid and urine excretion pattern among 50 older adults and 50 elderly subjects. Investigator reported that prevalence of viral fever, infections and diarrhoeal episodes were found higher in elderly as compared to younger women and therefore elderly people are more at risk of dehydration.

Table 1.1: Potential contributors to nutritional problems in elderly people

Physical Factors	Social and Psychological Factors
Reduced total energy needs	Depression
Declining absorptive and metabolic capacities	Loneliness
Chronic diseases	Social isolation
Anorexia	Bereavement
Changes in taste/odor perception	Loss of interest in food or cooking
Poor dentition	Mental disorders
Reduced salivary flow	Food faddism
Dysphasia	Socioeconomic factors
Lack of exercise	Inadequate cooking or storage facilities
Physical disability (restricting the capacity to purchase, cook, or eat a varied diet)	Poor nutrition knowledge
Drug-nutrient interactions	Lack of transportation
Side effect of drugs (anorexia, nausea, altered taste)	Shopping difficulties
Restrictive diets and Alcoholism	Cooking practices (resulting in nutrient losses)
	Inadequate cooking skills (men)

Source: Horwath, (1989).

Ageing process decreases the function of some organs and system. Age related declines in gastrointestinal and bone marrow functional reserve have been found to occur in elderly. This population also has increased frequency of inflammatory processes. These factors make elderly more prone to develop anemia (Olivares et. al., 1999). Anemia is found to be common in elderly and its prevalence increases with age (Ania et. al., 2001).

Although WHO has not set any cut off values for elderly. Most of the studies recommend use of reference values for hemoglobin concentration for older individuals, which are same as suggested by WHO for adults. Iron deficiency anemia is the main cause of anemia worldwide (Demaeyer and Adiels Tegman, 1985). Anemia should not be accepted as inevitable consequences of ageing.

The prevalence of anemia was studied using the reference standards in 15,093 subjects with complete laboratory results. It was found that it was highest in infants, teenage girls and young members and elderly (Daltman, Yip and Johnson , 1984). Successful ageing is not usually associated with anemia. Therefore, failure to evaluate anemia in elderly could lead to delayed diagnosis of potentially treatable conditions. Using world health organization criteria for anemia, hemoglobin less than 12gm/dl in women and less than 13gm/dl in men, the prevalence of anemia in elderly has been found to range from 8-44 % with the highest prevalence in 85 years and older (Ania et. al., 2001, Salive et. al., 1992, and Daly, 1989).

Prevalence of anemia in older individuals is about 50% in developing countries and 12% in developed countries (WHO, 2000). Anemia is mostly due to low iron intake or low bioavailability of dietary iron. However, inflammation/infection and chronic blood loss, predominantly from gastrointestinal tract are frequent etiological factors of anemia in elderly, especially in developed countries and in elderly women (Yip, 1989 and Dallman, 1988).

Though high prevalence of anemia in elderly makes it a condition that clinicians might expect to find frequently, several features of anemia make it easy to overlook. The onset of signs and symptoms is usually insidious and many elderly patients

adjust their activities as their bodies make physiological adaptations for the conditions. Older persons may become iron deficient because of inadequate intake or inadequate absorption of iron (Smith, 2000).

Untreated geriatric anemia has been associated with increased mortality, increased prevalence of various comorbid conditions and decreased function. Argyriadou and colleagues (2001) found significant differences in cognitive impairment in anemic versus non-anemic elderly patients in a cross sectional study in Greece.

According to Pennix et al. (1998) anemia is a risk factor for subsequent decline in physical performance in older persons. Elderly people who fulfilled WHO criteria had greater decline in physical performance than subjects who had borderline anemia.

In view of the prevalence and consequences of IDA the strategies advocated (INACG / WHO / UNICEF, 1998) for prevention and treatment of iron deficiency anemia are: dietary modification of increase iron intake and improve the bioavailability of dietary iron food fortification with iron, supplementation with iron and prevention and treatment of parasitic and other infections.

Supplementation with medicinal iron is a short-term strategy to combat IDA. Most of the supplementation studies are carried on preschoolers, adolescents and pregnant women. Only few supplementation studies have been done on elderly. Thus there is a need to observe the effect of iron folic acid (IFA) supplementation for the treatment of iron deficiency anemia in elderly. With this view, it was thought worthwhile to supplement iron folic acid to the elderly anemic women for a period of six weeks and evaluate its impact on their health.

The scenario can change if the elderly who are a neglected class of population are offered special dietetic care in addition to medical facilities. There are foods and formulas available commercially for infants and children. However there are no special foods available for the geriatric group of people. Many elderly have difficulty in getting and making home made food because of problems with food related activities ranging from purchasing to eating, lack of resources, absence of spouse and physical health problems. Well balanced formulations in the form of ready to use

mixes or easy to make and digest foods can serve as the best convenience foods for this population. In order to suite the target group and for good acceptability, these foods should have certain characteristics like low viscosity, nutrient density, good fiber content and high digestibility. Care should also be taken to design foods which are low cost, low in fat and flatulence factor, easy to chew and swallow and yet acceptable to the ageing palate. Feeding oneself with such nutritious food will add to self-confidence, feeling of security and improvement in the health status leading to high self-esteem and ability to carry out various activities.

All the above observations therefore indicate a need to improve the nutritional status by making suitable modifications. Therefore, in the present study an attempt was made to study various problems regarding food related activity and also different living arrangement on health and nutritional status of the elderly women and further to study the impact of selected foods on health and nutritional status of elderly.

Many non-traditional foods are becoming popular. These are well accepted by people because of increasing health awareness. Considering health benefits of soy, soybean has found place in the list of health foods to be used in daily diet. Soybeans are considered as functional foods. Functional foods are viewed as health promoting and may be associated with a decreased risk for certain diseases.

Soybean has gradually found a place in the diet of health conscious people. It is found that soybean has good potential because of its nutritive composition; especially its high biological value protein content and it can be used for feeding the needy groups. Soybean has a long and respected history as a versatile plant food that provides high quality protein but only minimal saturated fat. The food value and the essential amino acids content of Soybean are given in the appendices (Appendix—III A and B).

Soybean has various health benefits. Over last two decades, researchers have documented the health benefits of soy proteins, especially for those who take soy protein daily. Soy proteins have shown to reduce cholesterol levels, menopausal symptoms and the reduction of the risk for several chronic diseases like cancer, heart disease and osteoporosis (Wangen et. al., 2001).

Studies conducted over past several years have shown that soy protein is hypo-cholesterolemic. Studies done by Carroll et. al., (1991) has found that adding soy protein to the diet or replacing animal protein in the diet with soy, lowers blood cholesterol. Potter S M (1998) found that the cholesterol lowering effect of soy has been attributed to soy isoflavones, a class of phytochemicals found in soybeans. He showed that soy protein drinks that contain naturally occurring high levels of isoflavones reduce total cholesterol and LDL cholesterol, the so called “bad cholesterol”, in patients who had high cholesterol levels despite consuming a low fat and diet recommended for maintaining healthy heart.

The incidence of coronary heart disease is lower in nations consuming soy products as a major component of the diet. These findings are particularly good news for consumers with elevated cholesterol levels and/or a history of heart disease. According to Anderson et al (1995), every 1% reduction in cholesterol values is associated with an approximate 2-3% reduction in the risk of coronary heart disease. Based on results observed in different studies it can be assumed that a daily intake of 20-50 grams of isolated soy proteins could result in a 20-30% reduction in heart disease (Potter et. al., 1993).

Genistein (primary isoflavone) is found in soy, clover and only a few green plants. However, soy-based foods represent the only practical way consumers can incorporate genistein in their diet. As long as isoflavons are present, any type of soy food – soymilk, tofu, tempeh, textured vegetable protein or whole soybeans may offer cancer prevention and decrease in menopausal symptoms. A variety of soy products are available in the market with different flavors and textures and a low fat nutritionally balanced diet, which can be developed from them. These soy-based diets can help to control weight by providing high quality protein in a concentrated form and can be met in specifically designed low calorie/high nutrient, ready to eat meals (Soy Protein Council, Washington DC, 1987). Thus, the above-mentioned studies suggest the health benefits of soybeans in relation to several conditions.

The above literature was provocative in opening many vital issues related to elderly. The present study was therefore planned with the broad objective of exploring

problems related to diet and health and developing suitable measures for health promotion for the aged. The specific objectives of the study are as follows:

1. To assess problems regarding food related activities, diet, nutrition and disease profile of the elderly women with different living arrangements and age (aged 60 years and above). Following parameters were studied:

- a. Socio demographic status
- b. Activity pattern
- c. Problems regarding food related activities
- d. Nutritional status
- e. Clinical parameters
- f. Disease profile

2. To identify elderly anemic women and to study the impact of iron folic acid supplementation on physical and cognitive performance before and after intervention. This part of the study included assessment of the following parameters before and after intervention with IFA supplementation.

- a. Dietary intake
- b. Hemoglobin levels
- c. Physical performance tests
- d. Cognitive function tests

3. Development and evaluation of some selected nutritious food items for geriatric population. This aspect included the following sub objectives.

- a. Development of selected food items
- b. Sensory evaluation of foods
- c. Processing of food items for analytical procedures

4. To assess the impact of soy feeds on health and nutritional status of institutionalized elderly. To achieve this objective the following aspects were planned to study given parameters before and after soy intervention.

- a. Socio demographic status
- b. Activity and addiction pattern

- c. Nutritional status
- d. Clinical parameters
- e. Morbidity profile

The literature concerning the above issues has been reviewed in the next chapter.