Impact of Incorporation of Soya Based Recipes In Selected Old Age Homes

By

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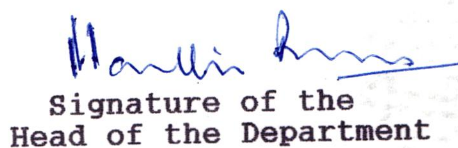

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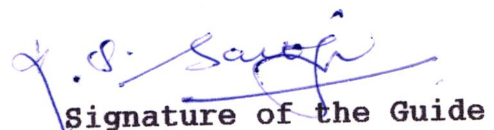

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Introduction

INTRODUCTION

"The aged are not much different from the young
They are the richest gift of all"

-Papi

"Ageing is an inevitable part of the cycle of life. It is a universal process experienced by everyone" (Mongia, 1997).

Health is generally felt to be a paramount importance for the quality of life, especially in old age, when physiological and other difficulties tend to accumulate and the end of life approaches.

A new generation,the elderly has emerged around the world outstripping all other age groups (Bakhru, 1995). India is also witnessing a silent demographic revolution due to a steady greying to its population, decline morbidity, reduction in birth rate and increase in life expectancy have lead to an alarming in the population of elderly.

Better health facilities and wider spread of medical care over the years have perceptibly raised life expectancy in India. The life expectancy at birth rise from 32.5 to 55.4 years for males while it increased from 31.7 to 55.7 years for females (Bali, 1997).

The world is greying rapidly with the rate of aging population exceeding the general population. In India there are over 70 million people above 60 years (6 percent of

population) which is likely to touch a hefty 12 percent by 2025 when the number will burgeon to about 150 millions (Sathyanarayana, 1997).

About 5 percent of all elderly persons reside in nursing homes or other institutions. Since this number has been slowly increasing, health care providers have become concerned about the nutritional status of this persons. Mainly elderly people in both developing and developed countries are institutionalised often irrespective of whether their ability to function requires it.

Until quite recently, especially in many industrialised countries, aged implied forced retirement, loss of physical functions, mental incapacity, and often the individuals isolation from normal social activities. Old people were deemed to be suffering from irreversible illness and were treated like sick children making "Old age" a diagnosis on its own right.

The problems of the aged are truely multidimensional and call for a multisectoral approach involving health, socio, economic and other disciplines almost simultaneously. The most common chronic health problems of the aged in the developed world include hearing impairment, cardiovascular disease, diabetes, dementia and cognitive functions and cancer. But for countries like India we used to add blindness, respiratory disorders, nutritional deficiencies etc (Medappa, 1997).

Nutritional status is increasingly, recognised as an important aspect of health in elderly. The challenge of meeting nutritional needs of the older population is compounded by the lack of needed research in this area, the interaction of current and past social, economic and psychologic factors and the wide ranges of individual differences in the biologic process of ageing. Nutritional requirements should atleast inpart, be based on data available for young adult population as well as requirement to counteract chronic diseases.

Marginal undernutrition is commonly seen in the population including the elderly. With increase in age, there are certain changes in nutritional status of the body and in the dietary intake and many personal beliefs become prevalent.

Major illness found in older adults are often associated with malnutrition and obesity. Many studies have shown that the elderly are protein deficient.

There is some controversy regarding how efficiently older persons use protein. The protein requirement of elderly persons appear to be about the same as or even greater than those of younger people to maintain protein balance in the body (Whitney etal, 1991). The RDA of 0.8 g/Kg of body weight for person 51 and older is the same as for younger person. Since persons over 51 need atleast as much protein as younger people but need few calories, a larger portion of their daily food intake should be from

protein sources. Studies on nutritional status of the elderly indicate that in actual this is often not the case. Some elderly have low energy intake, which when coupled with low protein intake leads to loss of muscle tissue illness, even if minor may lead to stress induced loss of protein (Suitor, 1984).

There is a basic need for quality protein though not in excessive amount to meet the needs of adults in our society. Protein needs are influenced by 2 basic factors. Biologic value of the protein or the quantity and ratio of its essential amino acids, and adequate caloric value of the diet. It is estimated that about 25 percent to 50 percent of the protein intake should come from animal sources, the only foods that are "Complete" protein with all the essential amino acids, with the remainder coming from plant sources. In a vegetarian diet careful supplementary mixtures of plant proteins with additions of acceptable milk and egg protein must be selected to assure adequate quality intake (Williams, 1990).

High quality protein means that the food has adequate amount of the essential amino acids needed by the body for protein synthesis. High quality proteins are found in eggs, dairy products, poultry and fish. Among plants soyabeans have high quality proteins (Piper, 1996).

Protein plays an important and unique place in man's diet. Protein should supply 15 percent to 20 percent of the days total kilo calories. The main source of protein for

Indian people is of vegetable origin. It constitutes 10 percent of the total caloric intake. Among different vegetable protein soyabean is the cheapest source with its 40 percent protein and 20 percent oil.

Both of which are very well adapted to the nourishment of animal and man. Soybean assumes the most predominant position in solving the food shortages created by the ever expanding population in India.

In countries like India, leguminous seeds provide the majority of protein that is required for human nutrition to supplement the carbohydrates of the cereals. soybean not only provides useful quantities of protein than in cereal rich diet, but also supplements the essential amino acid lysine.

The principle high protein food, regarded as a meat substitute which is derived from soybean and used on an increasingly large scale is soyaflour. First utilised in this way in the western world during the second world war, it now forms the basis of a range of foods known as Texturised vegetable protein or TVP and sold under various brand names. Many studies have undertaken to study the acceptability and impact of soyaflour.

Analysing the expanding elderly population and their need for protein, this present study was carried out to see the impact of incorporation of soya based recipes in selected old age homes with the following objectives.

- Select as many old age homes as possible in and around Coimbatore.
- Assess the nutritional status of the inmates before incorporating soyaflour.
- Introduce standardised soya incorporated recipe to the inmates and
- Assess the acceptability and impact of soya incorporated recipe among the inmates.

Review of Literature

REVIEW OF LITERATURE

The Review topics pertaining to the study titled "Impact of incorporation of soya based recipes in selected old age homes" are as follow:

A. Nutritional status of the elderly

B. Problems of the elderly

C. Problems of the inmates of old age homes

D. Health care for the elderly

E. Effect of incorporation of soya.

A. Nutritional status of the elderly

Elderly become vulberable to malnutrition owing to inappropriate dietary intake, poor economic status and social deprivation. Elderly are known to be easily subjected to inanition and avitaminosis resulting in multiple nutritional deficiencies. Urban slum dwellers, rural poor and those living alone appear to be at a higher risk of poor dietary intake. Though food consumption patterns of rural and urban elderly show a distinct difference, these are greatly influenced by regional dietary patterns, (Wadhwa etal, 1997).

According to position of the American dietetic Association (1993), the physiological changes associated with aging also play an important role in determining the nutritional status of elderly persons, reduction of lean body mass and total bone mass, changes

in glucose tolerance, insulin secretion, lipid metabolism, protein synthesis and alteration of hydration status and food pressure regulation may change nutrient requirements in older persons. Poor dentition, dryness of the mouth and decreased sense of taste and smell may diminish appetite and reduce food intake.

A study on elderly women by Ahuja etal (1995) in urban slums of Delhi revealed that mean intake of all the nutrients except thiamin and total vitamin A was below the RDI. Iron intake was only 50 percent of the RDI and there was an energy deficit of 200 - 400 kcals. They reported a significant association between the living arrangement and the nutritional status of elderly women aged 70 years and above. Those living alone had a lower intake of all nutrients compared to those living with their families.

Sabharwal etal (1997) in their study on Indian institutionalised elderly above 65 years of age revealed adequate energy, protein, calcium, thiamin, riboflavin, and vitamin C intakes as compared to the RDI while iron and vitamin A intakes were lower.

An anthropometric survey conducted in an urban area of Karnataka revealed that a higher percentage of normal weight subjects were in the age of 60 to 69 years and the higher percentage of underweight subjects were in the age group of 70 years and above (Sarojini etal, 1990).

In a study by Namnjeet etal (1993), Day today variability in biochemical indicators of iron status in well hydrated and healthy women of 70-79 years was determined. These data compared with previously published data in younger adults, demonstrate that ageing is associated with a decreased variation in some indexes of iron status such as Serum ferritin.

The National Nutritional monitoring Bureau covered several states by dietary survey and reports that the consumption of pulse and protective foods such as greenleafy vegetables, fruits, and milk is low. (Brahmam, 1994).

In a study on use of combined methodologies in assessing food beliefs and habits of elderly Greeks, 70 years and above by Kouris etal (1991) belifs like, meat should not be eaten more than once a week because it is bad for health and legumes are essential for longevity and should be eaten in moderation and is not essential to health etc, were believed by 75 percent of the subjects. When these beliefs were compared to actual intake, consumption in most cases, except that of legumes was compatible with the beliefs.

Menus provided by Food Service Managers of 43 boarding homes for the elderly in Washington State, USA were analysed for nutrient content and frequency with which disease preventive foods were offered. More than half

of menus exceeded recommended dietary goals for saturated fat, sodium and cholesterol by 33 percent. Over 60 percent of menus were deficient (less than 67 percent) compared to RDA for zinc, copper and magnesium. Nutrition knowledge and attitude scores of food service managers were not significantly correlated to the frequency. [Goren etal, 1993].

Department of Dietetics and General Medicine, Royal Victoria infirmacy, New castle (1993) in their study on the effect of dietary supplementation for frail elderly subjects in continuing care was assessed by using nutritional measures of anthropometry and biochemistry and an 8 week period of nutritional supplementation with a nutritionally complete drink, build up 2 units daily and upto 1500 KJ daily from glucose polymer. Before supplementation dietary intake did not reach current recommendation for most nutrients, but after supplementation only Vit D intake was inadequate. Anthropometric measures, triceps skin fold thickness, and arm muscle circumference. In the supplemented cohort were shown with significant difference.

Carver and Dobson (1995) conducted a study to determine the effect of dietary supplementation on elderly demented hospital residents. The height and weight of all residents (n = 293) were measured and Body Mass Index (BMI) calculated for each individual. 46 underweight residents (BMI 15.1 - 19.9 kg/m2) were matched by age, sex and BMI

and selected for dietary supplementation. There was increase in mean weight (P < 0.001), mid upper arm, muscle circumference (P< 0.005) and triceps skinfold thickness (P<0.001) in the supplemented group (n=23). This dietary supplements produced a highly significant increase in mean body weight as a result of increase in body fat and muscle protein.

Brahmam (1994), states that the proportion of individuals suffering from chronic energy deficiency (BMI < 18.5) increased from 16 percent in young males (20-44 years), to 29 percent among the 60-69 years age group and to nearly 38 percent among the 70 years and above the age group.

B. Problems of the elderly

Ageing successfully does not imply avoiding problems, changes or losses that come with age (Baltes, 1997).

The nutrition-related problems of the elderly are experienced by the physiological, psychological and socio economic interact to affect the nutritional well being of the individual. The nutrition problems that affect the elderly range from nutritional deficiences to nutrient excesses. (Mohanty and Mohanty 1990 and Amercian Dietetic Association, 1993)

By far the most prevalant nutritional related problems of the elderly are chronic conditions, that benefit from diet therapy such as obesity, atheroscelerosis, cardiovascular disease, diabetes, hypertension, osteoporosis, certain cancers, and gastro intestinal disorders. Lower than recommended levels of Energy, Calcium, Zinc and Vitamins B6, B12, and D have been noted in older population. Protein calorie malnutrition has been observed. particularly among frail home bound (or) institutionalized older persons (Guthrie, 1989 and American Dietetic Association, 1993).

Some of the problems accompanies with the process of ageing are briefly outlined in the following Table (Mongia, 1997).

Problems associated with ageing

Economic	Physical and Physiological	Psychological and Environmental
1. Income deficiency and Economic insecurity 2. Loss of employment/ retirement	- Nutritional deficiency - Physical helplessness leading to dependency on others. - Housing problems - Sensory functional change in vision hearing, taste smell, touch	- Loss of importance in the family - Feeling of neglect - Loneliness - Feelings of unwantedness - Feelings of inadequacy - Death of spouse - Change/disengagement in social contact - Obsolescence of skills education and expertise - Emerging intergenerational distance.

During old age, elderly people face different transitions which produce crisis. The most frequently sited crisis that are related to loss include widow hood, increased vulnerability to disease, pain, hospitalisation and physical depending, loss of income, reduction or loss of status, reduction or loss of physical sensory and cognitive functioning and preparation and pre - occupation with death and dying (Steinmetz, 1988).

Subchronical protein calorie malnutrition and biologically detectable deficiencies are known to be frequent in institutions (Dillon, 1982).

A study conducted by (Sha and Prabhakar 1997) states that the most common health problems of the elderly are related to chronic diseases as a result of increase in life expectancy. Hearing impairment is the most common morbidity followed by visual impairment.

The problems associated with the ageing of the population are that of absence of facilities for medical treatment and of providing economic and social support. The health problems are mainly associated with disability, and degenerative diseases such as cataract, hearing loss, malignancies, atherosclerosis etc.

Chandra (1993), Dey and Chaudhry (1997) in their study on infections in the elderly, have pointed that, along with decline in immunity, morphological changes in various organ makes the elderly especially vulnerable to infection. In clinical pratice, infections of respiratory tract, and urinary tract, endocarditis septicaemia and tuberculosis are commonly encounted in elderly subjects.

The functional and morphological changes that occur with ageing are accompained by an increased risk of certain conditional like drug-induced nephrotoxicity and acute tubular necrosis, increased risk of anesthesia due to presence of other co-existant illness (Mandhani etal, 1997).

According to Samal and Ramakrishna (1997) some gastrointestinal symptoms may be secondary to age related physiological changes. (e.g. presbyoesophagus). certain diseases like diverticulosis are more common in the elderly whereas they may have unusal presentation of complicated peptic ulcer diseases.

Dalal (1997) reported that the Indian population will survive through the peak years of occurance of stroke (55-65 years) and stroke survivors in the elderly with varying degree of residual disability will be a major medical problem; hypertension is an independent and treatable factor for strokes in the young and the elderly.

Ageing affects all parts of the ear. A prevalance of 3.7 to 3.3 percent was found in general population surveyed in rural and urban areas respectively (Kacker, 1997).

According to Rao (1997), Mental morbidity in the elderly comprises mainly affective disorders (manic depressive psychosis) and psycho-organic syndrome, delirium and dementia. Psychyiatric disorders occurs with physical disorder, or handicap or co-morbidity is the hall mark of geriatric medicine.

Amosun and Reddy (1997) states that Dementia, depression alcoholism, neglect and suicide are some of the most important mental health issues affecting older people.

In a study by Vijayakumar (1995) points out that nearly 85 percent of the aged tend to have low income and little accumulated savings. As a result, many of them all in a poor position to maintain even optimum standards of food, clothing, housing and social amenities.

It is a widely held belief that the elderly are set in their ways and will not try new foods. This may apply to some elderly people, just as it applies to some children or other age groups, but as a generalisation for any of them it is open to challenge (Davies, 1984).

C. Problems of the inmates of old age homes

Shabeen Ara (1997) views that though institutionalization of the elderly is a new phenomenon in India, a number of old age homes have come up and there is a need for many more homes in India. Investigation with regard to the status of the aged in the changing social structure have more or less concluded on the breaking down of kindship and family organisations which has put the elderly in a state of helpessness, isolation and economic dependence.

According to Chaddha (1995), there is a significant difference exists between institutionalised and non institutionalised elderly regarding the size of the social support network. The non institutionalised elderly were found to be involved more in socializing activities while the whole schedule of the institutionalised elderly was regulated according to the lunch and dinner timings at home.

In a study by Sabharwal etal (1996) on the nutritional status of the institutionalised elderly at three residential homes of Delhi, most of the inmates had normal anthropometric measurements. Of the subjects who were visually obese, a higher proportion were women. There was a high (72 percent) prevalence of anaemia in the sample because dietary iron was low and the subjects were suffering from many chronic diseases.

A review of the health status of the inmates of old age homes reveals that the majority of respondents in these homes were suffering from physical ailments and the aged who are institutionalised seem to have more health problems. The proportion of women having physical aliments was higher than that of men. The duration of illness was found to be longer among females. The proportion of males with physical handicaps was high. Heart disease, blood pressure, asthma, anemia and eye defects were the common health complaints of the inmates (Ara, 1995).

Flint etal (1979) on their study on the nutritional assessment of community and institutionalised elderly in Australia demonstrates that, the older person may not be able to eat enough food because of physical problems and other factors include poor nutrition, and phychological factors. They said that elderly people who live independently in the community are in good State of folate, ascorbic acid, zinc and protein nutrition. The nutritional status of the institutionalised elderly with respect to these nutrients is poor. Underlying disease may be contributory to these nutrient deficiencies. However the poor nutritional status of the institutionalised may be due to inadequate nutrient intake, which may inturn relate to catering techniques.Lower than recommended levels of Energy, Calcium., Zinc and vitamins B-6, B-12 and Vit D have been noted in certain segments of the older population. Protein calorie

malnutrition has been observed, particularly among institutionalised older persons.

Warner (1985), points out that, since the institutionalisation of the elderly people are increasing, increased attention is now being given to prospects for decanting geriatric institutionalised and planning new forms of care. Many of the institutionalised elderly are psychiatric patients and have gone through a debilitating hospitalisation experience. If they do not remain hospitalisation means, they will have a critical need for alternate forms of supervised community and residential care.

Samat (1992) and Patri (1996) concluded that no significant differences existed between the self concept scores of the elderly in the family setting and those in the institutionalised setting. The institutionalised aged were found to have greater feelings of loneliness, depression and hopelessness.

Results of a study by Susheela (1997) indicated that emotional bond which places family as a unit is gradually shaking. The elderly constitute a heterogenous group with varied orientations, needs and resources. Hence it is not wise to draw any generalisation as whether to encourage or discourage institutionalisation. Promotion of physical, mental and social well being of the elderly residents would be the final goal in starting ideal old age home.

D. Health care for the elderly

The major focus of all the welfare programmes undertaken by the Government for the welfare of the elderly persons must be on maintaining their links to their families and community to promote their sense of security and satisfaction. The rural aged women have always been ignored, who in no way contribute less than the aged men in the household. There is no emprical study to probe into their life satisfaction and needs. Therefore they deserve special attention to the educationsists, researchers, planners and executors of intervention programme. It will be worth while and to study this group to find ways and means of using their manpower for productive purposes and chalk out appropriate and suitable programmes for their care and welfare (Nalinadevi and Karpagam, 1995).

Many more people are now reaching old age with prolongation of life expectancy. They need care and support to improve the quality of their life. It is important that we promote the health and wellness of the elderly. They must be enabled to carryout their daily routine with dignity and without too much dependence on others in the family or on drugs (Francis, 1993).

In a study by Moris (1997) it is given that, improving physical fittness, and enhancing the capabilities that activates the elderly are a crucial part

of the answer to the problem of increasing longevity. The Roman author Cicero's opinion, "It is our duty to resist oldage, to compensate for its defects by a watchful care; to fight against it as we would fight against disease, to adopt a regimen of health; to practise moderate exercise".

Michel (1997) emphasised in his study that training course of non professional primary health care workers should be promoted as widely as possible by local, regional and national authorities. This will undoubtedly contribute to reduce in health care costs while at the same time improving the quality of life of the elderly, whatever position they occupy in the community.

In Germany, the ageing well programme is concentrating on assisting existing self help group to raise awareness about osteoporosis and what can be done to prevent it. In Italy two regional health promotion projects have been launched offering information courses to older people on a wide range of subjects including nutrition, home accidents, exercise and activity, medication, getting advice from pharmacist and best out of the doctor. In the Netherland the Ageing well group has received funding from the Ministry of Health (Greengross 1997).

American Dietetic association (1993), reported that, the nutrition services offered in the institutional and non institutionalised health care setting are often

limited and are typically loosely integrated. The level and determinants of nutritional status in the community based and insitutionalised older population should be monitored with attention given to variability in social and demographic characteristics and both physical and cognitive functioning.

Investing in health and promoting it at every stage in life, taking a lifespan approach to healthcare, will help more than anything else to ensure that people grow old in good health, and continue to enjoy living and contributing to the happiness of others. To make poeple more aware of these opportunities, the theme for World Health Day in 1999 - which has been designated by the United Nations as the international year of older persons - will be healthy ageing (Nakajima, 1997).

E. Effect of incorporation of Soya

In India's effects to improve nutritional health, soy beans - a recently introduced crop, hold a great deal of promise for both the rural and the urban population. Research has shown soy foods to be easily preparable, highly nutritious and inexpensive. Soya flour can be substituted for wheatflour and be incorporated into Indian diet. Soy foods have a high protein content and high protein utilization (the percentage of available protein the body can use) leading to the highest amount of protein gained.Studies on the effect of soymilk on

malnourished children have found soymilk to be "an effective nutritious food for infants and children suffering from nutritional disorders" (Jain 1988).

A study by Numfor and Noubi (1995) showed that adding some full fat soyabean flour to fermented cassavaflour will result in comparable improvements in the flour's protein content and other nutritional elements such as iron, phosphorous, and gross energy. The adoption and uses of this composite flour by population in which cassavafufu is a staple food will contribute, to reduce the prevailing protein malnutrition.

The substitution of soya protein for animal protein as the addition of soya protein to the diet, may reduce total and low density lipoprotein cholesterol levels by 20 percent in hypercholesterolemic subjects. (carrol, 1991).

Soy fiber had distinctive functional and nutritional properties. The total dietary fiber (TDF) in the soybean cotyledon and soyhull was respectively 79.8 percent and 75.6 percent. The nutritional aspects of Soyabean cotyledon fibre indicated that it has direct effect of the gastrointestinal tract by acting as a regulating agent in nutrient absorption and bowel function and an indirect effect on blood lipids and glucose metabolism. This study concluded by recommending, use of soy fiber in developing new formulations to meet the increasing demand of health conscious consumers (LO, 1989).

According to Gandhi and Ali (1986), by blending soydhal with riceflour and soyaflour and also other dhals the protein content of the product and the final taste were improved.

A study was undertaken to evaluate the role of a mixed diet consisted of defatted soyaflour, wheat bran and roasted barley flour (as pyrodextrins) on the blood sugar and lipid profile in fifty four obese diabetes (type II), the results revealed that the trial diet influenced blood sugar levels and lipid profile, and such a diet produced maximum fall in fasting blood sugar (0.09 percent), followed by Post prandial Blood Sugar (12.23 percent). The fall in various lipid fractions (serum cholesterol, Triglycerides Blood lipids) of course was not remarkable by statistically significant (Potdar etal, 1994).

Soyaflour can be successfully incorporated into yamflour to improve nutritional quality of Amala. The yamflour substituted with 20 percent full fat soyaflour has a similar protein content compared to that substituted with 20 percent defatted Soyflour and the added advantage of a greater caloric value due to its high fat content. These qualities recommended its use for people with restricted food intake like infants or the sick (Akingbala etal, 1995).

The soyabean processing and utilisation SPU project at the Central Institute of Agriculture Engineering has developed soya fortified biscuits, one hundred grams for soya fortified biscuits contain 12 gms of protein, 24 gms of fat and 500 calories have 50 percent more protein than ordinary biscuits which have a great potential for combating malnutrition, and particularly suitable for diabetics who requires low carbohydrate and high protein diet (Gandhi, 1992).

Methodology

METHODOLOGY

Methodology pertaining to the study entitled "Impact of incorporation of Soya based recipes in selected old age homes" had the following steps.

A. Selection of old age homes

B. Selection of samples.

C. Collection of background information of the selected Samples

D. Assessment of Nutritional status of the inmates before incorporating soyaflour.

E. Mean Nutrient intake of the selected samples.

F. Selection, standardisation and organoleptic evaluation of Soya incorporated recipe.

G. Introduction of soya incorporated recipe to the inmates.

H. Acceptability of soya incorporated recipe.

I. Assessment of impact of soya incorporated recipe.

A. Selection of old age homes.

The study was conducted in Coimbatore. Two old age homes situated 5 to 10 kms away from Avinashilngam Deemed University, which provides food to the inmates were selected for the study. Missionaries of charity, Puliakulam and Gurusaranalayam, Nayakkanpalayam were selected for the study, based on the access and cooperation of the authorities of the old age homes. Both the old age home are charity homes.

B. Selection of samples

The elderly (inmates) of the old age homes were selected as samples by purposive sampling method.

Kothari (1996) states that, purposive sampling is a type of non random sampling, where the organisers of enquiry purposively choose the particular units of the universe for constituting a sample on the basis that the small mass that they select out of a huge one will be typical or representative of the whole. Among the 190 inmates of 2 old age homes, 83 elderly people were selected as samples, of which 26 constituted men and 57 were women.

C. Collection of Background information of the selected samples

Interview method was used to collect the background information of the inmates. Interview is one where a list of question statements relating to the investigation is prepared and these questions were put to selected group and the answers were recorded by the investigator (Chaudhary, 1991).

Information like, socio economic factors, food habits past and present meal pattern, the inmates satisfaction about the present meal pattern, and their interest in taking soya rich recipes were collected. The inmates health status was also assessed. (Appendix I).

D. Assessment of nutritional status of the inmates before incorporating soya flour

Nutritional status refers to the health of an individual as affected by intake and utilisation of nutrient. The nutritional status of selected 83 elderly people were assessed using anthropometric measurements like height and weight measurements. The linear measurement height was measured with the help of fibre glass tape. Weight of the individual was measured using a bathroom scale.

Body Mass Index (BMI) was calculated from the recorded height and weight of the individuals.

A value not directly measured but calculated from height and weight data is the Body Mass Index (BMI), an indicator of body fat content (Robinson etal, 1991).

$$BMI = \frac{\text{Weight (kg)}}{\text{Height } (m^2)}$$

E. Mean Nutrient intake of the selected samples

The mean nutrient intake of the selected samples were calculated by 24 hour recall method. Since the type and quantity of food served for males and females in both the old age homes were same, the mean nutrient intake was calculated using only one value for both males and females.

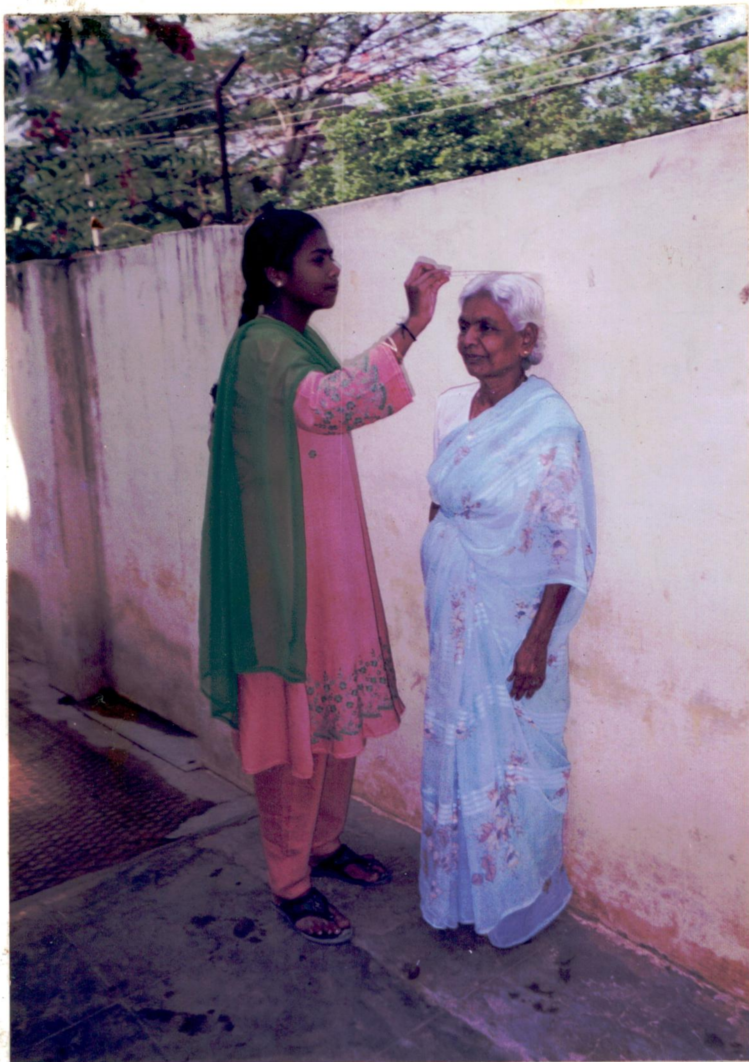


PLATE – 1
MEASURING THE HEIGHT OF THE SAMPLE

PLATE – 2
MEASURING THE WEIGHT OF THE SAMPLE

PLATE - 3
CONSUMPTION OF MEALS BY THE INMATES

F. Selection, standardisation and organoleptic evaluation of soya incorporated recipe.

a. Selection of recipe

Information regarding the menu provided to the inmates of the 2 old aged homes were collected. Sambar the recipe which is daily served in both the old age homes alone was feasible to incorporate the soyaflour. Hence sambar was selected to incorporate soyaflour.

b. Standardisation of the selected recipe

According to stadler etal (1986), a standardised recipe is one that has been tested for quality and quantity, sambar the selected recipe was standardised, incorporating 15 percent of roasted defatted soyaflour. The nutritive value of the standard and soya based sambar is given in Appendix II. The nutrient content of the both standard and soya based sambar prepared with 50 gms red gram dhal are as follows

Nutrients	Standard	15 Percent soya incorporated
Energy (k.cal)	248	255
Protein (g)	11.83	13.74
Fat (g)	5.95	5.86
Calcium (mg)	49.58	72.19
Iron (mg)	2.54	3.03
Fibre (g)	1.45	1.62
Thiamine (mg)	0.286	0.299
Riboflavin (mg)	0.144	0.149
Niacin (mg)	1.484	1.429

C. Organoleptic evaluation of the standardised recipe

The sambar prepared with 15 percent incorporation of soyaflour was subjected to organoleptic evaluation for acceptability by a panel of 16 members. A score card was employed for evaluation. The sambar was rated on a three point scale (Appendix III).

G. Introduction of soya incorporated recipe to the inmates.

Soyaflour was given to the old age homes and the cooks were explained about the method of incorporating soyaflour. While the sambar was boiling, they mixed the roasted defatted soyaflour in the sambar.

The amount of dafatted soyaflour to be added was given to them by the investigator. This was carried out for a period of one month. The incorporation was frequently checked by the investigator.

H. Acceptability of soya incorporated recipe

The acceptability trials of defatted soyaflour incorporated sambar by the inmates were assessed by using a score card using three point scale.

I. Assessment of impact of soya incorporated recipe.

After the incorporation of defatted soyaflour in sambar at 15 percent level for a period of one month, the impact was assessed in terms of improvements in Body Mass Index and nutrient intake of the selected samples.

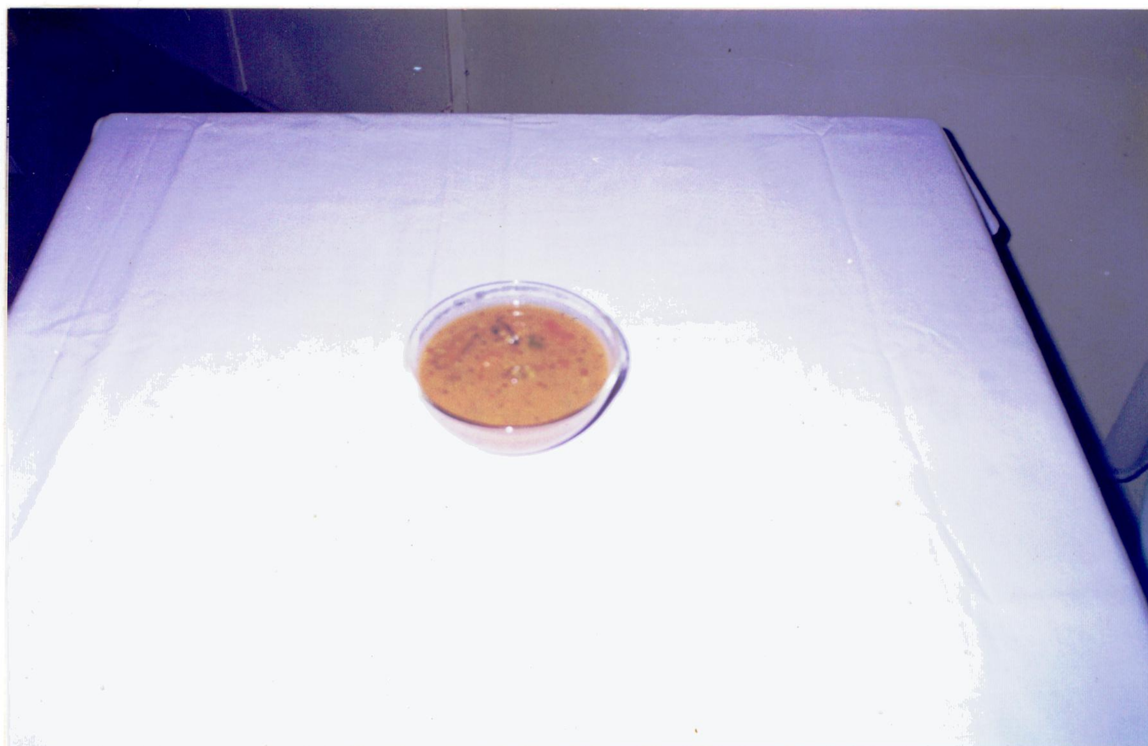


PLATE- 4

STANDARDISED SOYA INCORPORATED SAMBAR

PLATE- 5

INCORPORATION OF SOYA FLOUR IN THE SAMBAR PREPARED IN OLD AGE HOME

Results and Discussion

RESULTS AND DISCUSSION

The Results and Discussion of the study entitled "Impact of incorporation of soya based recipes in selected old age homes" are presented under the following headings.

A. Background information of the selected samples.

B. Food habits of the selected samples.

c. Past and present meal pattern of the selected samples.

D. Prevalence of Disease conditions among the selected samples.

E. Acceptability of the soya incorporated recipe

F. Mean nutrient intake of the selected samples before and after incorporation of soya based recipe.

G. Weight and Body Mass Index of the selected samples before and after incorporation of soya based recipe.

A. BACK GROUND INFORMATION OF THE SELECTED SAMPLES

Table - I presents the background information of the selected elderly samples of two old age homes, Missionaries of charity and Gurusaranalayam.

TABLE - I

BACKGROUND INFORMATION OF THE SELECTED SAMPLES

Particulars	Males [n=26]	Females [n = 57]
AGE		
Middle adulthood		
[[40-60 years]	3	12
Older adults		
[60-80 + years]	23	45
EDUCATION		
Illiterate	7	38
Primary	12	12
Middle	6	6
High	1	1
Type of exercise	NIL	NIL
Type of work		
sedentary	26	57

i. AGE

Three males out of the 26 selected elderly male samples and 12 females out of the 57 selected elderly female samples belonged to the middle adulthood (40 - 60 years). whereas the majority of the samples 23 males and 45 females were in older adulthood (60 - 80 + years). This classification is according to williams (1989), who classified the adulthood into young adulthood (18-40 years)

Middle adulthood (40-60 years) and older adulthood (60-80 + years).

ii EDUCATION:

Among the 83 samples 7 males and 38 females were illiterates, 12 males and 12 females had primary education, 6 males and 6 females had education upto middle school and only one male and one female had high school education. The present generation of elderly have had less education than the younger generation and they may be more influenced by exagerated claims for health foods and supplements (Robinson, 1991). The educational level of the selected elderly were on par with the above statement.

iii. TYPE OF EXERCISE AND ACTIVITY

The collected data revealed that none of the samples had the habit of doing exercise. All the samples were doing sedentary work.

B. FOOD HABITS OF THE SELECTED SAMPLES

Food habits of the samples of the two old age homes are presented in Table II.

TABLE II

FOOD HABITS OF THE SELECTED SAMPLES

Food habits	Males (n = 26)	Females (n = 57)
Vegetarian	7	9
Non vegetarian	19	46
Ova vegetarian	Nil	2

Suitor (1984), states that the food habits of the elderly are the result of life time influences of cultural, social, economic and psychologic factors. The individual who has had poor food habits, throughout life is not likely to be in as good health as the one who has enjoyed the benefits of a good diet. Table - II depicts that 7 males and 9 females were pure vegetarians while 19 males and 46 females were non vegetarians. Only 2 females were ova vegetarians. However since only vegetarian menus were provided in one elderly home, the 17 males and 30 females of this old age home consumed only vegetarian foods.

C. PAST AND PRESENT MEAL PATTERN OF THE SELECTED SAMPLES

The past and present meal pattern of the selected inmates are given in Table - III.

TABLE - III

PAST AND PRESENT MEAL PATTERN OF THE SELECTED SAMPLES

Past meal pattern	Number of samples	present meal Pattern I	II
BREAK FAST			
Idli / Dosai	38	Idli / Dosai /	Pongal / Idli /
Idli, Dosai / Rice		Kanji / Bread /	Dosai / Uppuma /
Sambar, Vegetable, Curd	23	Puttu / Uppuma	
Rice Sambar Vegetable			
Curd	16		
Ragi kanji	1		
Rice kanji	4		
Roti	1		
LUNCH			
Rice, Sambar, Vegetables Curd	81	Rice, Sambar / Rasam / both Vegetalbes	Rice, Sambar, Rasam Vegetables, 1 tsp of ghee Butter milk
Kanji	1		
TEA TIME			
Tea	35	Tea	Tea
Coffee	17		
Tea / Coffee	24		
DINNER			
Idli / Dosai / Rice Sambar	8	Rice Sambar / Rasam	Tamarind rice or Lemon rice or Coconut rice or Vegetable rice
Idli / Dosai	7		
Rice, Sambar	67		
Roti	1		

I. Missionaries of charity
II. Gurusaranalayam.

From the Table II, it is clear that before coming to the old age homes, 38 samples consumed tiffin items like idli or dosai for breakfast. Twenty three samples consumed either idli, dosai or rice, sambar, vegetables. Among the selected samples, only few samples consumed rice kanji(n=4), ragi kanji(n=1) and roti (n=1).

The majority of the selected samples (n = 81) consumed rice, sambar, vegetables and curd for lunch. Only one sample used to have kanji for lunch.

Thirty five samples used to have tea in the evening and coffee is consumed by 17 samples. Twenty four samples consumed either tea or coffee during the tea time.

For Dinner 7 samples were used to have tiffin items like idli , dosai, 8 samples consumed either idli, dosai or rice and sambar. The majority of the samples (n = 67) consumed rice, sambar for dinner. Only one of the selected sample who is a north Indian had the habit of eating roti for the dinner.

The above discussion could be supported by Guthrie (1989) stating that "the food patterns and preferences of the elderly are largely the result of long standing food habits. Since eating patterns are deeply ingrained and have many social and psychological implications, any dietary change should be approached with atmost sensitivity to an individuals feelings".

There is no difference in the present meal pattern of the elderly samples of both the old age homes. Whatever food is provided in the homes, the inmates are used to consume that food. In the old age home I which is a charity home, the inmates were served with the alternatives like, idli, dosai, kanji, bread, puttu, uppuma and rarely chappathi for breakfast. They were served with rice, sambar or rasam or both with or without vegetable for lunch. If possible, along with the tea which was provided in the evening some snacks will be provided to the inmates. For dinner, the inmates were served with rice, sambar or rasam.Weekly once, they were provided with meat or egg.

Whereas in old age home II, which is also a charity home the inmates were provided with any one of the tiffin items like pongal, idli dosai and uppuma for the breakfast. For lunch the inmates were provided with rice, sambar, rasam and a vegetable, buttermilk along with a spoon of ghee. Tea was given in the evening time. Any one variety rice items like, tamarind rice, lemon rice, coconut rice, vegetable rice were served during the dinner time. Here the menu followed is strictly vegetarian menu.

When the satisfaction about the present menu served in these two old age homes were assessed from the respective selected samples, almost all the inmates were satisfied with the menu provided in the old age homes. only one sample was dissatisfied with the present menu.

Except one male and two female samples who needed modification in the present menu to improve its taste, other samples required no modification in the present menu provided in the old age homes.

When the inmates of the two old age homes were asked about their knowledge about soyaflour, only 10 males and 7 females said that they heard about soyaflour.

Almost all the males and females of the two institutions except 2 females were interested in taking protein rich soya incorporated recipes.

D. PREVALENCE OF DISEASE CONDITIONS AMONG THE SELECTED SAMPLES

List of diseases prevalent among the samples of two old age homes are presented in Table -IV

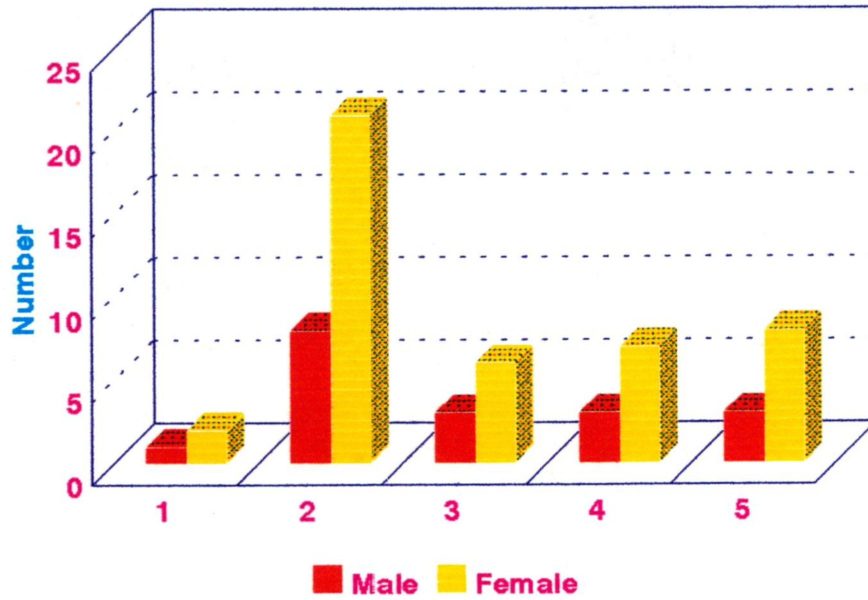
TABLE IV

LIST OF DISEASES PREVALENT AMONG THE SELECTED SAMPLES

Disease	Number of males	Number of females
Diabetes Mellitus	1	2
Atherosclerosis	NIL	NIL
Tuberculosis	NIL	NIL
Osteoporosis	8	21
Constipation	NIL	5
Fever	NIL	3
Cold	3	6
Dental problem	3	7
Asthma	3	8
Blood pressure	2	4
Oedema	NIL	2
Chest pain	1	1
Skin allergy	2	1
Neck pain	NIL	1
Nerve weakness	NIL	1
Arthritis	1	1
Headache	1	1

Bettyl Kuriyan (1998), reported that, old age has great deal more to it considering the deterioration of general health and the rise of health related problems, stress related ailments like, heart disease, diabetes, the incidence of old age disabilities like parkinson's and Aizheimer's are on the rise. From the table IV it is clear that the major problem of elderly staying at old age home is osteoporosis. Eight males and 21 females were affected by osteoporosis, 3 males and 7 females have dental problem, 3 males and 6 females were suffering from cold. Asthma has affected 3 males and 3 females of the samples. Few samples had other health problems like blood pressure, Oedema, chest pain, skin allergy, neck pain, nerve weakness, arthritis and headache (Figure. 1).

The data collected regarding the onset of disease of the inmates revealed that 2 samples suffered from diabetes mellitus for the past two years, and only one sample suffered for the past one year. Four samples suffered from osteoporosis for the past one year. Eight samples suffered from osteoporosis for the past 5 years. For the past 10 years 6 samples suffered from the same disease. Four samples suffered from Asthma for past 5 years and 4 samples had asthma for past 10 years. Only one sample had skin allergy for the past 10 years.



Prevalence of disease conditions among the selected samples
Fig. 1

1. Diabetes mellitus
2. Osteoporosis
3. Cold
4. Dental problem
5. Asthma

Four males, 5 females modified their diet after the diagnosis of their disease, who suffered from diabetes and asthma. They avoided taking sweets and cold foods respectively.

E. ACCEPTABILITY OF THE SOYA INCORPORATED RECIPE.

i. Table V shows the mean scores obtained for organoleptic evaluation of standardised, 15 percent soya incorporated sambar given by a panel of 16 members

TABLE V

ORGANOLEPTIC EVALUATION OF THE STANDARDISED SOYA INCORPORATED SAMBAR

Criteria	Scores obtained	
	Soya incorporated sambar	standard
Appearance	2.9	2.9
colour	3	3
Flavour	3	3
Taste	3	2.9
Consistency	2.7	3
Overall acceptability	2.92	2.96

Except for the consistency of the sambar all other criterias got the maximum scores. The overall acceptability score obtained was 2.92. The acceptability trial coincides with study by pallavi et al, (1993) on substitution of 15

percent of defatted soyaflour in a snack Nankhatai in which the customers acceptance was similar to the control group.

ii. The acceptability of soya incorporated sambar was assesed in both the old age homes. Table VI shows the mean score points given by samples of old age home I for the acceptability trials.

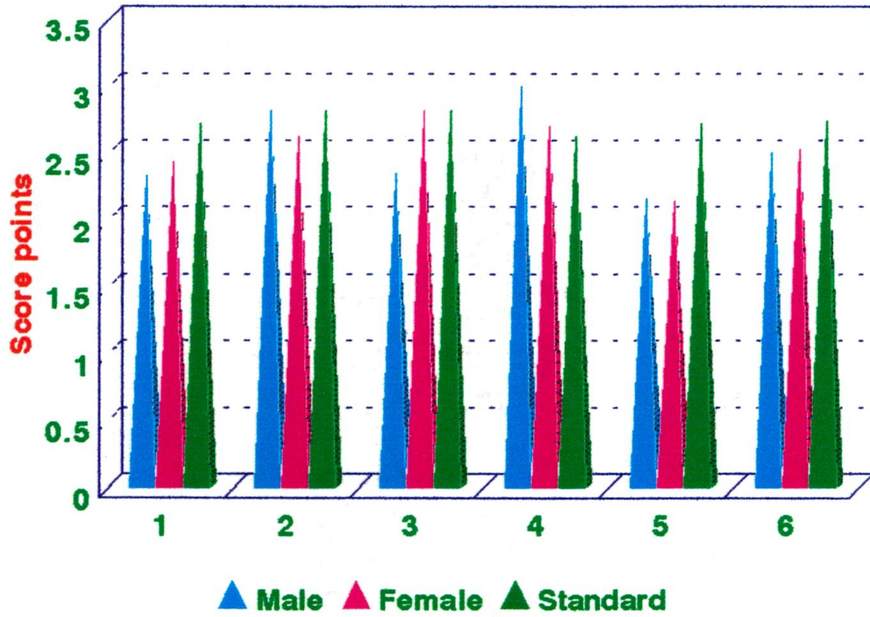
TABLE - VI

ACCEPTABILITY SCORES OBTAINED FOR THE SOYA INCORPORATED SAMBAR BY THE SAMPLES SELECTED IN OLD AGE HOME - I

criteria	Males [n = 9]	Females [n=27]	Standard
Appearance	2.5	2.6	2.9
Colour	3	2.8	3
Flavour	2.5	3	3
Taste	3	2.9	2.8
Consistency	2.4	2.4	2.9
Over allacceptability	2.66	2.72	2.92

Almost all the samples gave higher score points for appearance, colour, flavour and taste. Consistency has little less score than other attributes. The mean points for overall acceptability by the males [n=9] was 2.66 and females [n=27] was 2.72. When compared against standard, it was only 0.26 and 0.20 less than the mean scores of the standard (Figure. 2).

iii. Table VII shows the score points given by the samples of old age home II for the acceptability trials of soya incorporated sambar



Acceptability scores obtained for soya incorporated sambar by the samples selected in old age home -I

Fig. 2

1. Appearance
2. Colour
3. Flavour
4. Taste
5. Consistency
6. Overall acceptability

TABLE VII

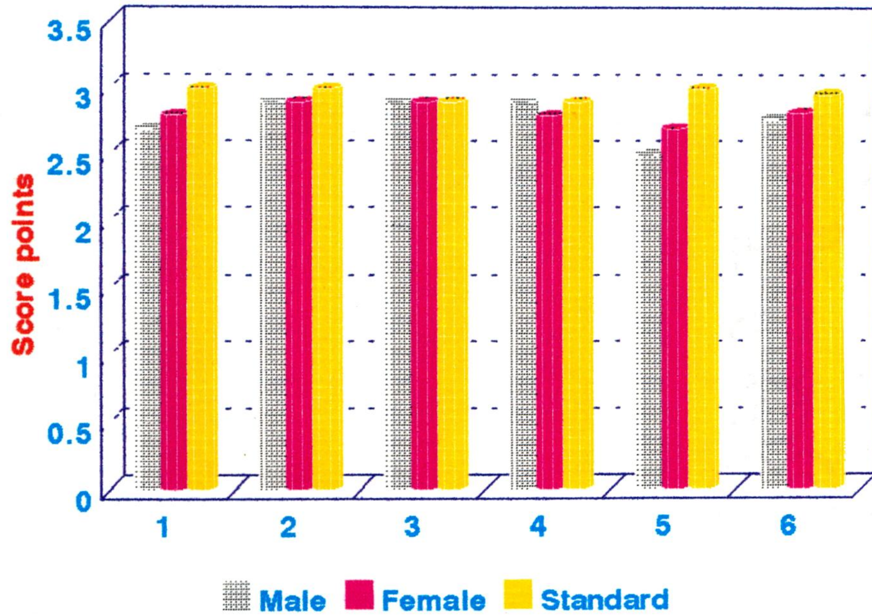
ACCEPTABILITY SCORES OBTAINED FOR THE SOYA INCORPORATED SAMBAR BY THE SAMPLES SELECTED IN OLD AGE HOME - II

Criteria	Males(n=17)	Females(n=30)	Standard
Appearance	2.7	2.8	3
Colour	2.9	2.9	3
Flavour	2.9	2.9	2.9
Taste	2.9	2.8	2.9
Consistency	2.5	2.7	3
Over all acceptability	2.78	2.82	2.96

All the quality attributes of soya incorporated sambar received similar scores. The overall acceptability score obtained for standard was 2.96 while it was 2.78 and 2.82 for soya incorporated sambar rated by males and females respectively (Figure. 3).

F. MEAN NUTRIENT INTAKE OF THE SELECTED SAMPLES BEFORE AND AFTER INCORPORATION OF SOYA BASED RECIPE

In table VIII the mean nutrient intake of the samples of the two old age homes are presented.



Acceptability scores obtained for the soya incorporated sambar by the samples selected in old age home - II
Fig. 3

1. Appearance
2. Colour
3. Flavour
4. Taste
5. Consistency
6. Overall acceptability

TABLE VIII

MEAN NUTRIENT INTAKE OF THE SELECTED SAMPLES BEFORE AND AFTER INCOPORATION OF SOYA BASED RECIPE

Nutrients	RDA		Old age home - I		Old age home - II	
	Males	Females	Before incorporation	After incorporation	Before incorporation	After incorporation
Energy (k.cal)	2425	1875	1107	1114	1278	1278
Protein (g)	60	50	33.08	36.7	33.66	35.6
Fat (g)	20	20	22.3	22.3	38.9	38.8
Calcium (mg)	400	400	270.4	289.39	266.4	271.6
Iron (mg)	28	30	5.4	6.1	5.4	5.9
Fibre (g)	-	-	5.1	5.2	2.3	2.4
ß Carotene (µg)	2400	2400	288	288	288	288
Thiamine (mg)	1.2	0.9	1.2	1.18	0.62	0.7
Riboflavin (mg)	1.4	1.1	0.9	0.09	0.5	0.5
Niacin (mg)	16	12	10.2	10.2	7.6	7.6

The above Table shows the mean nutrient intake of the selected samples of both the old age homes. Since the type and quantity of foods served for males and females in both the old age homes were same, the mean nutrient intake of both the males and females were calculated and presented as one. The Table VIII clearly reveals that, in both the old age homes, except for fat all the other nutrient intake were lower than the Recommended Dietary Allowances.

In both the old age homes, there was not much difference in calories both before and after incorporation of soya based recipe. With regard to protein there was an increase by 3.62 gms in old age home I and 1.89 gms in old age home II. Due to the incorporation of protein rich soyaflour, the protein content of the diet increased in both the old age homes. With respect to calcium, iron and fibre there was an increase in both the old age homes. The calculated nutritive value of the diets both before and after incorporation of soya based recipe in both the old age homes were presented in Appendix IV.

G. WEIGHT AND BODY MASS INDEX OF THE SELECTED SAMPLES BEFORE AND AFTER INCORPORATION OF SOYA BASED RECIPE.

i) Table IX points out the increased body weights of the selected samples after the incorporation of defatted soyaflour.

TABLE IX

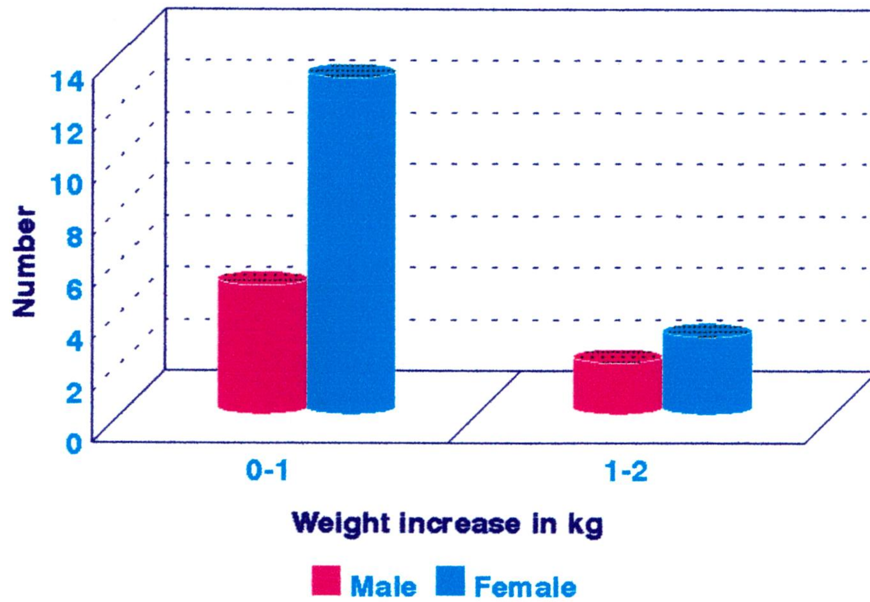
INCREASE IN WEIGHT OF THE SAMPLES AFTER INCORPORATION OF SOYA BASED RECIPE

Weight increase (kg)	No. of Males	No.of Females
0-1	5	13
1-2	2	5

There was a significance change in the body weights of both males and females., after one month incorporation of soya based recipe which is served in both the old age homes. Five male samples and 13 females showed 1 kg weight increase whereas 2 male samples and 5 female samples increased by 2kg in their body weight than before the incorporation of soya based recipe (Figure.4). The result coincides with the study by carver and Dobson (1995), in which the dietary supplements on elderly demented hospital residents produced a significant increase in mean body weight as a result of increase in body fat and muscle protein.

The weight of the selected samples before and after incorporation of soya based recipe was presented in Appendix V.

ii. Body Mass Index of the selected samples before and after incorporation of soyaflour are shown in Table-X.



Increase in body weight of the selected samples after the incorporation of soya based recipe
Fig. 4

TABLE X

BODY MASS INDEX OF THE SELECTED SAMPLES BEFORE AND AFTER INCORPORATION OF SOYA BASED RECIPE

BMI	NUMBER OF MALES		NUMBER OF FEMALES	
	BEFORE INCORPO RATION	AFTER INCORPO RATION	BEFORE INCORPO RATION	AFTER INCORPO RATION
Under weight				
<20	18	17	36	36
Normal				
20-25	8	9	18	18
Overweight				
> 25	NIL	NIL	3	3

Body Mass Index - this measure has been shown empirically to be the simple and quantitative anthropometric indicator of body composition and thus of nutritional status.

The normal range for the Body Mass Index is set at 20-25kg/m^2. Any value significantly below this range is taken to indicate underweight while values above this range would be considered to indicate varying degrees of overweight or obesity.

Less than 29kg/m^2	Under weight
20-25	normal
30-40	obesity
4o+	severe obesity.

In elderly, loss of lean tissue and bone mass may mean that Body Mass Index remains within the normal range even though more direct measures fatness may indicate excess adiposity.

From the Table X it could be conferred that 18 males and 36 females were underweight (BMI<20,), 8 males and 18 females were normal weight (BMI-20-25) and 3 females were overweight (BMI>25) before the incorporation of soya based recipe. After the incorporation of soya based recipe for a period of one month, it was noted that one male sample had an increase in Body Mass Index there by attained the normal weight. Thus the number of males who had normal weight increased from 8 to 9. In case of females there was no significant change in all the three categories. Though there was a significant increase in the body weights of the selected samples, there was no marked change in the Body Mass Index. Only one of the male samples gained normal weight (BMI -20-25) from underweight [BMI < 20] after the incorporation of soya based recipe.

Summary and Conclusion

SUMMARY AND CONCLUSION

The present study on "Impact of Incorportaion of Soya based recipes in selected old age homes" was carried out to introduce soya incorporated recipes to the samples of selected old age homes and to assess the acceptability and impact of incorporation of soya based recipe among the samples.

A total of 83 elderly samples constituting 26 males and 57 females age from 50 to 94 years in two old age homes were selected purposively for the study. An interview schedule was designed and used to collect the background information of the samples. Anthropometric measurements like height and weight of the samples were taken before and after incorporation. The findings of the study are,

1. Out of 83 selected samples 68 samples belonged to older adulthood and 15 samples belonged to younger adult-hood.

2. Majority of the females were found to be illiterates. Only one male sample was educated upto high school level, while the rest of the samples were educated upto primary level.

3. Sixty five samples were non-vegetarians, 16 vegetarians and 2 ova vegetarians.

4. While considering the past meal pattern of the samples, it was found that most of the samples preferred rice, sambar, vegetables and curd for lunch and dinner. They consumed tiffin items for breakfast.

5. There is no difference in the present meal pattern of the elderly samples of both the old age homes.

6. Except one sample, all the samples were satisfied with the menu provided in the old age homes.

7. All the samples except two females were interested in taking protein rich soya incorporated recipe.

8. The prevalence of diseases like diabetes mellitus, osteoporosis, asthma and dental problems were found to be higher among the selected samples of the two old age homes.

9. Only a minor difference was noted in the acceptability scores obtained for soya incorporated sambar by the samples in old age home I when compared with the standard, where as in old age home II, all the quality attributes of soya incorporated sambar received similar scores as standard.

10. Before incorporation of soya based recipe, the mean nutrient intake of the samples in both the old age homes were less than that of the Recommended Dietary Allowances.

11. After incorporation of protein rich Soya based recipe, the protein content of the diet in both the old age homes increased. Calcium, Iron and Fibre contents also increased.

12. Before incorporation, the number of samples who were underweight (n=54) was higher than the samples who were normal (n=26) and overweight (n=3)

13. After incorporation of soya based recipe for a period of one month a significant increase in the weights of 18 females and 7 males was noted.

14. No significant change was noted in Body mass Index of the samples, eventhough the weight increased after incorporation.

Thus the findings of the study reveals that the diet of the samples in old age homes was deficient in protein, and the incorporation of soya based recipeincreased the protein content of the diet, and the significant increase in the weight of the samples was noted after a period of one month.

RECOMMENDATIONS:

1. Realising the importance of increasing elderly population and number of charity old age homes, to increase the protein content of the diets served in the old age homes, defatted soyaflour which has got therapeutic values, should be incorporated in the recipes.

2. Longitudinal Studies should be carried out to study the impact of soya incorporated recipes in both government and non-government old age homes in improving the nutritional status of the inmates.

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Appendices

APPENDIX – I

AVINASHILINGAM DEEMED UNIVERSITY
COIMBATORE - 641 043.

QUESTIONNAIRE TO ELICIT INFORMATION ABOUT THE SELECTED SAMPLES

IMPACT OF INCORPORATION OF SOYA BASED RECIPES IN SELECTED OLD AGE HOMES.

1. Name of the Institution :
2. Name :
3. Age :
4. Sex :
5. Education :
6. Occupation - held :
7. Type of activity :
8. Height :
9. Weight :
10. BMI :
11. Type of exercise :
12. Food habits:

    Vegetarian :

    Non Vegetarian :

    Ova Vegetarian :

13. Meal Pattern

	PAST	PRESENT
Breakfast		
Lunch		
Tea		
Dinner		

14. Are you satisfied with the menu served in the institution?

Yes [ ]   No [ ]

15. Do you need any modification in the present menu?

Yes [ ]   No [ ]

If yes, what type of modification is needed?

16. Have you heard about soyaflour?

Yes [ ]   No [ ]

17. Are you interested in taking protein rich soya incorporated recipes?

Yes [ ]   No [ ]

18. Are you having any of the following

Diebetes Melltius	[ ]	Constipation	[ ]
Atherosclerosis	[ ]	Fever	[ ]
Tuberculosis	[ ]	Cold	[ ]
Osteoporosis	[ ]	Dental Problem	[ ]
Asthma	[ ]		

Any other specify

19. Age of onset of the Disease

20. Have you modified your diet after diagnosis of the disease?

Yes [ ]   No [ ]

If yes, please give the details

Foods avoided	Foods restricted

APPENDIX II

a. NUTRITIVE VALUE OF SAMBAR (STANDARD)

Ingredients	Amount (g)	Energy K.Cat	Protein (g)	Fat (g)	Calcium (mg)	Iron (mg)	Fibre (g)	Thiamin (mg)	Roboflavin (mg)	Niacin (mg)
Redgram dhal	50	168	11.1	0.85	26.5	1.35	0.75	0.23	0.095	1.45
Onion	30	15	0.36	0.03	0.18	0.15	0.18	0.02	0.03	0.012
Tomato	30	6	0.21	0.06	14.4	0.19	0.24	0.036	0.018	0.012
Tamarind	5	14	0.16	0.01	8.5	0.85	0.28	-	0.001	0.01
Oil	5	45	-	5.0	-	-	-	-	-	-
		248	11.83	5.95	49.58	2.54	1.45	0.286	0.144	1.484

b.NUTRITIVE VALUE OF SAMBAR WITH 15 PERCENT SOYA FLOUR

Ingredients	Amount (g)	Energy (K.cal)	protein (g)	fat (g)	Calcium (mg)	Iron (mg)	Fibre (g)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)
Redgran dhal	42.5	14.2	9.48	0.78	31.03	1.15	0.6	0.19	0.08	1.2
Soya flour (Defatted)	7.5	33	3.53	0.04	18.08	0.69	0.32	0.053	0.02	0.195
Onion	30	15	0.36	0.03	0.18	0.15	0.18	0.02	0.03	0.012
Tomato	30	6	0.21	0.06	14.4	0.19	0.24	0.036	0.018	0.012
Tamarind	5	14	0.16	0.01	8.5	0.85	0.28	-	0.001	0.01
Oil	5	45	-	5	-	-	-	-	-	-
		255	13.74	5.86	72.19	3.03	1.62	0.299	0.149	1.429

APPENDIX III

SCORE CARD USED FOR ORGANOLEPTIC EVALUATION OF PANEL MEMBERS AND ASSESSMENT OF ACCEPTABILITY TRIALS OF SOYA INCORPORATED SAMBAR BY THE SAMPLES.

CRITERIA	1	2	3
APPEARENCE			
V. Good			
Good			
Fair			
COLOUR			
V. Good			
Good			
Fair			
FLAVOUR			
V. Good			
Good			
Fair			
TASTE			
V. Good			
Good			
Fair			
CONSISTENCY			
Thick			
V. Thick			
Thin			

APPENDIX IV

a. NUTRITIVE VALUE OF THE DIET BEFORE INCORPORATION OF SOYA FLOUR

[OLDAGE HOME -I]

Ingredients	Amount (g)	Energy (K.cal)	protein (g)	fat (g)	Calcium (mg)	Iron (mg)	Fibre (g)	β-Carotene (μg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)
Rice	130	500	8.32	0.52	11.7	1.3	0.26	-	0.27	0.07	4.9
Red gram dhal	75	251	16.73	1.28	54.75	2.03	1.3	-	0.34	0.14	2.18
Brinjal	30	4	0.42	0.09	6	0.11	0.18	-	0.12	0.33	2.7
Beans	50	8	3.7	0.05	25	1.3	2.9	-	0.17	0.01	-
Onion	30	15	0.36	0.063	0.18	0.15	0.18	-	0.24	0.003	0.12
Tomato	30	6	0.21	0.06	14.4	0.19	0.24	-	0.04	0.028	0.12
Milk	160	108	4.16	5.33	156	0.26	-	288	0.08	0.304	0.16
Sugar	20	80	0.02	-	2.4	0.031	-	-	-	-	-
Oil	15	135	-	15	-	-	-	-	-	-	-
		1107	33.08	22.33	270.43	5.37	5.06	288	1.15	0.88	10.18

b. NUTRITIVE VALUE OF THE DIET AFTER INCORPORATION OF SOYA FLOUR

(OLD AGE HOME-I)

Ingredients	Amount (g)	Energy (K.cal)	protein (g)	fat (g)	Calcium (mg)	Iron (mg)	Fibre (g)	β-Carotene (μg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)
Rice	130	500	8.3	0.52	11.7	1.3	0.26	-	0.27	0.07	4.9
Redgram dhal	63.75	214	14.22	1.08	46.5	1.7	0.96	-	0.29	0.12	1.9
Soyaflour (Defatted)	11.25	44	5.28	0.12	27.11	1.04	0.48	-	0.08	0.03	0.29
Brinjal	30	4	0.42	0.09	6	0.11	0.18	-	0.012	0.33	2.7
Beans	50	8	3.7	0.05	25	1.3	2.9	-	0.17	0.01	-
Onion	30	15	0.36	0.003	0.18	0.15	0.18	-	0.24	0.03	0.12
Tomato	30	6	0.21	0.06	14.4	0.19	0.24	-	0.04	0.028	0.12
Milk	160	108	4.16	5.33	156	0.26	-	288	0.08	0.304	0.16
Sugar	20	80	0.02	-	2.4	0.031	-	-	-	-	-
Oil	15	135	-	15	-	-	-	-	-	-	-
		1114	36.72	22.25	289.39	6.081	5.2	288	1.182	0.922	10.19

C. NUTRITIVE VALUE OF THE DIET BEFORE INCORPORATION OF SOYA FLOUR

(OLD AGE HOME - II)

Ingredients	Amount (g)	Energy (K.cal)	protein (g)	fat (g)	Calcium (mg)	Iron (mg)	Fibre (g)	β-Carotene (μg)	Thiamine (mg)	Riboflavin (mg)	Niacin (mg)
Rava	60	209	6.24	0.48	9.6	0.96	0.12	-	0.07	0.02	0.96
Rice	120	415	7.68	4.8	10.8	1.2	0.24	-	0.25	0.06	4.56
Redgram dhal	60	201	13.38	1.02	43.8	1.62	0.9	-	0.27	0.114	1.76
Coconut	15	67	0.68	6.24	1.5	0.3	0.54	-	0.001	0.02	0.12
Bengal gram dhal	2	7	0.42	0.11	1.12	0.11	0.02	-	0.01	0.001	0.05
Tamarind	5	14	0.16	0.01	8.5	0.85	0.28	-	-	0.01	0.01
Ladies finger	15	5	0.285	0.03	9.9	0.05	0.18	-	0.01	0.02	0.01
Butter milk	80	12	0.64	0.88	24	0.01	-	-	-	-	-
Milk	160	108	4.16	5.33	156	0.26	-	288	0.08	0.03	0.16
Oil	15	155	-	15	-	-	-	-	-	-	-
Ghee	5	45	-	5	-	-	-	-	-	-	-
Sugar	10	40	0.01	-	1.2	0.02	-	-	-	-	-
								-			
		1278	33.66	38.9	266.42	5.38	2.28	288	0.621	0.5	7.6

APPENDIX – V

AGE AND WEIGHT OF THE SELECTED SAMPLES BEFORE AND AFTER INCOPORATION

No	Age	Weight Before incorporation (kg)	Weight After incorporation (kg)	No	Age	Weight Before incorporation (kg)	Weight After incorporation (kg)
FEMALES							
1	50	38	38	23	65	62	62
2	50	32.5	32.5	24	67	34	34
3	52	47	47	25	70	34	34
4	53	48	48	26	70	36	36
5	53	48	49	27	70	36	37
6	55	34	34	28	70	37	38
7	57	38	38	29	70	38	38
8	58	29	29	30	70	40	40
9	58	33	33	31	70	43	44
10	58	40	40	32	70	47	47
11	58	60	60	33	70	47	47
12	58	47	47	34	70	48	50
13	60	35	35	35	70	62	62
14	60	40	41	36	73	34	35.5
15	60	41	41.5	37	75	28	28
16	60	45	45	38	75	43	43
17	60	45	45	39	75	44	44
18	63	60	60	40	75	51	52
19	63	60	60	41	76	30	30.5
20	65	35	35.5	42	78	44	45
21	65	36	38.5	43	80	34	34
22	65	45	45	44	80	38	38

45	80	38	38.5	69	70	60	60.5
46	80	40	42	70	70	50	50
47	80	44	44	71	71	48	48
48	80	45	46.5	72	72	36	36
49	80	57	57	73	73	40	40
50	82	49	49.5	74	76	45	45
51	82	55	55	75	77	50	51
52	83	56	56	76	77	57	57
53	85	56	56	77	78	50	50
54	86	54.5	54.5	78	78	61	61
55	90	41.5	42	79	78	33	33
56	92	42	42	80	80	41	41
57	94	45	45	81	80	46	46
MALES							
58	55	55	55	82	83	60	60
59	55	43	45	83	86	43	43
60	56	34	34.5				
61	60	35	35				
62	63	55	55.5				
63	65	42	44				
64	65	68	68				
65	66	43	43				
66	67	38	38				
67	70	45	45.5				
68	70	41	42				