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Research Article

DIETARY INTAKE AND PHYSICAL ACTIVITY STATUS OF ELDERLY LIVING IN MUMBAI CITY

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ABSTRACT

Old age is associated with physiological, social, economical and pshychological changes. The health status, functionality and mobility in elderly is affected by nutritional status, physical activity and prevelance of any disease. This study was carried out to understand relationship between dietary pattern and its effect on nutritional status of elderly. 100 elderly samples aged 50 years and above were randomly included in the study purpose. A predesigned questionnaire was used to collect the data. Results were statistically analysed. The results showed a positive corelation between decrease in appetite and increased age. The study indicated that pulses and milk consumption decreased with an increase in age ($p<0.05$). Only a few percentage of population met their energy, protein, calcium, iron and fibre requirement, but the results were not statistically significant. There was a significant positive correlation of age groups with walking and brisk walking ($p<0.05$). Thus, dietary intake and physical activity status of elderly residing in Mumbai city is very low.

INTRODUCTION

Old age is defined as the age of retirement that is, 60 years and above (9). It is associated with changes in lifestyle and health, affecting the types of foods consumed and the nutritional status. A high prevalence of under-nutrition is found in elderly and a significant high prevalence of over nutrition is also now seen in this population. An individual can attain highest quality of life by adopting healthy practices like moderate physical activity, healthy eating, abstinence from any form of addiction and rational use of medication (1). Various factors related to older age, such as fading memory, declined cognitive function, and impaired hearing and/or vision may possibly affect the ability to give reliable information on dietary intake(2). There are a large number of risk factors which have their significant impact on nutritional status, which is reflected in variety of items, included in various screening tools, but there is no such type of gold standard tool for dietary quality assessment of Indian rural elderly people (4). Illness increases with age, thus older population has greater needs for health care (5). Ageing is frequently associated with decreases in taste acuity and smell, deteriorating dental health, and decreases in physical activity, which may all affect nutrient intake (6). Nutrition and physical activity impact functional changes through changes in body composition (7).

Objectives: To assess the dietary intake and physical activity and its effect on ability and mobility status of elderly living in Mumbai city.

Method: A community based cross-sectional study was conducted in the city of Mumbai. House to house visits were made and 100 elderly aged of 50 years and above were included in the study using a predesigned questionnaire. Food frequency questionnaire was used to collect information regarding frequency of various foods. 3 days dietary recall was used to calculate dietary intake. Anthropometric measurements were being collected using standard tools. Questionnaire was used to assess the physical activity status of the elderly. Elderly

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were classified in 3 groups <60 years, 60-70 years and >70 years for analysis purposes.

Statistical Methods: Analyses were performed using SPSS software for Windows (version 16.0, 2007, SPSS Inc, Chicago, IL). Data are presented as frequency (percentage). The frequency distributions were tabulated for dietary intake according to age groups and were compared using cross tabulations and chi-square test. Kendall Tau B test was used to find correlation of age groups with frequency of food intake and physical activity. P-value < 0.05 was considered to be statistically significant.

RESULTS

Data on 100 elderly aged 50 – 90+ years is presented. Of the 100 elderly, 15% were <60 years, 59% were 60-70 years and 26% were > 70 years of age.

Change in appetite: Thirty Seven percent elderly had decreased appetite while 67% elderly had normal appetite. **Figure 1** represents change in appetite according to age group. There was a significant association of decrease in appetite and age group with higher percentage of elderly above 70 years having decreased appetite as compared to 60-70 year and <60 year old elderly ($\chi 2=7.218$, p=0.027) (**Figure 1**).

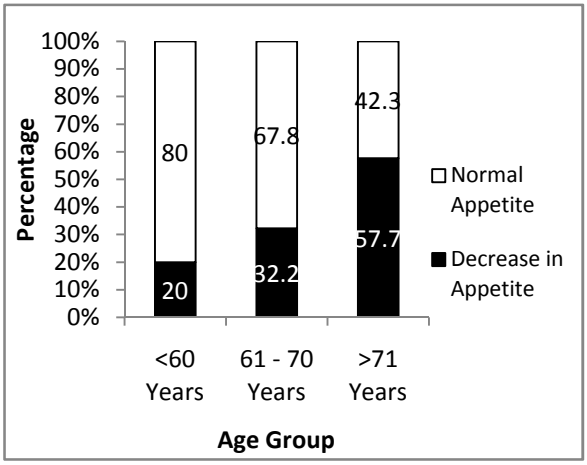

Figure 1 Appetite According to age group

consume commercial juice and 45% did not consume junk foods ever (**Figure 2**).

There was a significant negative association of pulses (kendall'sTau b= -0.236, p<0.05) and milk (kendall'sTau b= -0.357, p<0.05) consumption with age groups indicating that pulses and milk consumption decreased with an increase in age. There was no association of age with consumption of cereals (kendall'sTau b= -0.049), nuts and oil seeds (kendall'sTau b= -0.013), curds (kendall'sTau b= -0.129), eggs (kendall'sTau b= 0.171), non-veg (kendall'sTau b= 0.138), dark green leafy vegetables (kendall'sTau b= -0.131), fruits (kendall'sTau b= -0.013), ready to eat foods (kendall'sTau b= -0.121), commercial juice (kendall'sTau b= 0.158) and junk food (kendall'sTau b= -0.066) (p>0.05).

Frequency of Food Intake: Figure 2 presents frequency of food consumption by the elderly. Of the 100 elderly, 92% consumed cereals, 36% consumed pulses, 13% consumed nuts and oil seeds, 68% consumed milk, 18% consumed curd, 17% consumed eggs, 9% consumed non-veg, 74% consumed vegetables, 21% consumed dark green leafy vegetables, 51% consumed fruits, 16% consumed sweets, 16% consumed ready to eat foods, 2 % consumed commercial juice and junk foods on a daily basis. On the other hand, 1% did not consume cereals, 5% did not consume pulses, 31% did not consume nuts and oil seeds, 19% did not consume milk, 22% did not consume curd, 37% did not consume eggs, 37% did not consume non-veg, 7% did not consume vegetables, 5% did not consume dark green leafy vegetables, 8% did not consume fruits, 14% did not consume sweets, 35% did not consume ready to eat foods, 80 % did not consume commercial juice and 45% did not consume junk foods ever (Figure 2).There was a significant negative association of pulses (kendall's Tau b= -0.236, p<0.05) and milk (kendall's Tau b= -0.357, p<0.05) consumption with age groups indicating that pulses and milk consumption decreased with an increase in age. There was no association of age with consumption of cereals (kendall's Tau b= -0.049), nuts and oil seeds (kendall's Tau b= -0.013), curds (kendall's Tau b= -0.129), eggs (kendall's Tau b= 0.171), non-veg (kendall's Tau b= 0.138), dark green leafy vegetables (kendall's Tau b= -0.131), fruits (kendall's Tau b= -0.013),

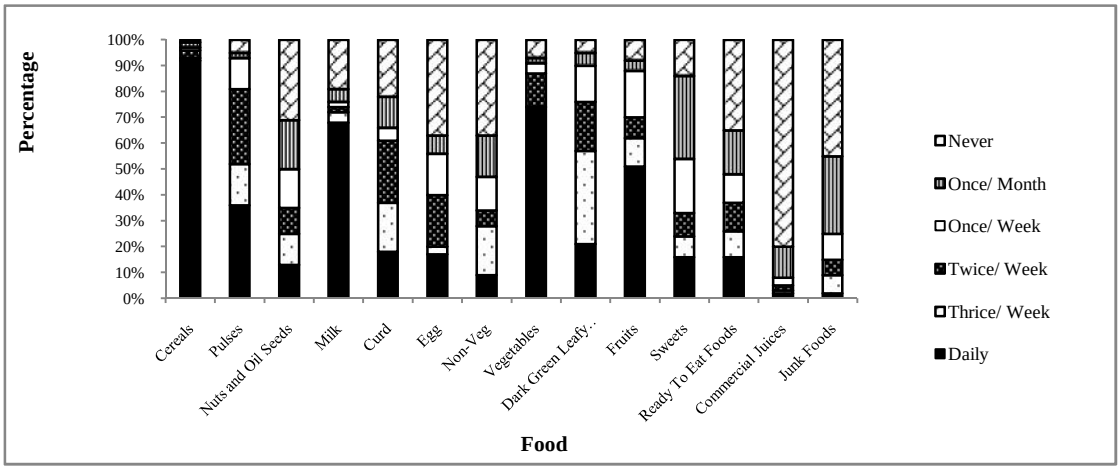

Figure 2 Frequency of consumption of foods

ready to eat foods (kendall's Tau b= -0.121), commercial juice (kendall's Tau b= 0.158) and junk food (kendall's Tau b= -0.066) (p>0.05).

Activity and mobility: last line- (kendall's Tau b= 0.104) (p > 0.05)

Dietary Intake: Sufficiency of dietary intake was assessed based on whether the elderly met their recommended dietary allowance for various nutrients. From the 100 elderly, 15% met energy requirement, 40% met protein requirement, 29% met calcium requirement, 27% met iron requirement and 7% met fiber requirement per day. **Table 1** presents the percentage of elderly meeting their dietary requirements when classified according to age groups. Lower percentage of elderly above 70 years met their protein requirement whereas higher percentage of elderly above 70 years met their energy and calcium requirement as compared to other 2 groups, however this difference was not significant. There was no significant association of age group and iron or fiber intake (p>0.05).

Table 1 Elderly meeting recommended dietary intake according to age group

	< 60 years	60– 70 years	>70 years	X2	P value
Energy	2 (13.3)	7 (11.9)	6 (23.1)	1.818	0.403
Protein	6 (40)	27 (45.8)	7 (26.9)	2.669	0.263
Calcium	2 (13.3)	18 (30.5)	9 (34.6)	2.251	0.324
Iron	4 (26.7)	17 (28.8)	6 (23.1)	0.302	0.860
Fiber	1 (6.7)	4 (6.8)	2 (7.7)	0.026	0.987)

Activity and mobility: Of the 100 elderly, 7% were bed ridden whereas 93% were able to get out of bed. There was no significant association between age groups and mobility [Bed ridden 1(6.7%) <60 years, 4 (6.8%) 60- 70 years, 2 (7.7%) > 70 years; able to get out of bed 14 (93.3%) <60 years, 55 (93.2%) 60- 70 years, 24 (92.3%) > 70 years ($\chi 2$=0.026, p>0.05). **Table 2** describes the percentage of elderly engaged in various activities. Of the 100 elderly, 50% did walk, 15% did brisk walk, 13% did yoga, 21% did light activity and 16% did other activities daily. There was a significant positive correlation of age groups with walking (kendall'sTau b= 0.204) and brisk walking (kendall's

Table 2 Percentage of elderly engaged in activity according to age groups

	Daily	Thrice/ Week	Twice/ Week	Once/ Week	Once/ Month	Never
Walking	50	7	8	7	4	24
Brisk Walking	15	5	5	5	4	66
Yoga	13	1	3	5	6	72
Light Exercise	21	3	8	1	5	62
Other activity	16	5	3	4	5	67

Tau b= 0.196) (p<0.05) indicating that walking increases with increase in age. There was no significant association of age groups with yoga (kendall'sTau b= 0.354), light exercise (kendall'sTau b= 0.691) and other activity (kendall'sTau b= 0.104) (p>0.05).

DISCUSSION

Nutrition is an important element of Health in the older population and affects the aging process. The prevalence of malnutrition is increasing in this population. It is associated with a decline in: functional status, impaired muscle function, decreased bone mass, immune dysfunction, anemia, reduced cognitive function, poor wound healing, delayed recovery from surgery, higher hospital readmission rates, and mortality (8).
The average daily intake of food decreases as the person ages. This physiological age-related reduction in appetite and energy intake has been termed the "anorexia of aging" (9). The gastric intestine changes due to aging. Gastric motility is impaired with aging, but the small intestine is unaffected (10). From the study, as the age increases the appetite goes on decreasing. Also, due to various physiological changes such as dental problem and reduction in sense of taste and smell the appetite reduces. The overall reduction in acid secretions predisposes the gut to small bowel bacterial overgrowth (11). Bacterial overgrowth has been proven to be associated with reduced body weight and reduced intake of micronutrients (12). It is estimated that the appetite decreases as the person ages. Also, as the person ages the cellular mechanism which control the contraction of the intestinal muscles tends to decrease causing reduction in appetite. Aging causes decline in the number of the small intestinal villi, flattening of the villi height and thus reduced function in the villi. Caloric restriction in mice appeared to reverse age-related changes, indicating that diet influences age-related changes (13).Thus, proper nutrition in elderly can help to reduce the symptoms of anorexia of aging, and help to maintain normal gut functioning.

In elderly population, nutrition is associated with reduced risk of mortality and morbidity. Several studies have suggested that individuals consuming a traditional Mediterranean diet have a reduced risk of CVD, cancer and neurodegenerative diseases (14,15). Method of assessing the food intake plays an important role to understand the dietary intake pattern in elderly. In the current study the frequency of consuming 15 food groups by elderly, was being assessed using Food Frequency Questionnaire (FFQ). FFQ is one of the methods to assess the frequency of consumption of a particular food. FFQ is the widely accepted as the most suitable assessment tool in large epidemiological studies that help to understand the relation of diet with chronic diseases. This is because they help in providing information about the dietary pattern over a long period of time without. The FFQ is currently the most frequent method used to assess food intake in large population-based studies. This method, with a single measurement, provides a convenient assessment of the habitual dietary intake of an individual (16). In the study all the elderly consumed cereals daily. Few of them consumed pulses and fruits daily. The reason for low pulse and fruit consumption could be increased purchasing rate of fruits and pulses which is not afforded by majority of the elderly due to low or no source of income or due to family constraints. Above 70% of elderly consumed vegetables daily, thus suggesting that the consumption of vegetables is not the problem in this population. But the type of vegetable consumed is not known, as the FFQ did not have any separate column for the type of vegetables such as roots and tubers or the vegetables from the gourds family. Also, only few of the elderly consumed green leafy vegetables daily, which may be due to poor food choices, low availability of or problems related to cleaning and cooking of these leafy vegetables, especially in single or homebound elderly. Thus, it is important to promote the consumption of fruits and vegetables in the elderly. A high intake of fresh fruit, root vegetables, and fruiting vegetables is associated with reduced

mortality, probably as a result of their high content of vitamin C, provitamin A carotenoids, and lycopene (17). In this study, it was also seen that very few of the elderly population had a habit of consuming junk foods daily, which is a good indicator of knowledge among elderly about the ill-effects of consuming junk food.

The nutritional status of the elderly is highly influenced by physiological, psychological and social factors. Thus, they are at a high risk of nutritional deficiency.In the study, only 15% met their energy requirements. Various factors influencing food consumption could be the reason of low food intake and thus failure to meet the energy requirement in them. This concludes that the overall intake of food in elderly is low thus the energy requirement is also not met. Lower energy consumption in the elderly can be accompanied by a general decrease in nutrient intake or by an increase in nutrient density such as a selective decrease in consumption of the ‘‘non-nutritive energy’’ in sugar- sweetened beverages (18).

Guidelines for dietary protein intake have recommended similar intake for all adults, regardless of age or sex, i.e. 1 gram of protein per kilogram of body weight each day (1g/kg BW/d). (19) The need for more dietary protein is in part because of a declining anabolic response to protein intake in older people; more protein is also needed to offset inflammatory and catabolic conditions associated with chronic and acute diseases that occur commonly with aging (20). Also, recent research suggests that dietary protein is an essential nutrient to bone health throughout the lifespan and may actually be beneficial, not deleterious to bone as once thought (21). The vast majority of population studies examined older adults and found the data generally support a positive association between protein intake and bone health. High-protein intake may positively impact bone health by several mechanisms, including calcium absorption, stimulation of the secretion of IGF-1, and enhancement of lean body mass (22).When older adults have acute or chronic diseases, their activities are more limited, they are less likely to consume adequate food, and they fall farther behind in energy and protein intake.As a result, malnourished older people recover from illness more slowly, have more complications, and are more frequently admitted to hospitals for longer stays than are healthy older adults (23). In the current study the elderly ranged between 60-70 years had adequate protein intake. This could be due to more milk, pulse and other soft protein food intake, such as egg, as they have difficulty in chewing due to physiological changes. Thus, adequate protein intake helps to promote good health, reduces muscle wasting, supports early recovery from illness and also improves the functional status of elderly.

The RDA for calcium requirement is 600mg per day for both adults male and female (19). Calcium is the most abundant nutrient in the body is very important for maintaining normal physiological functions. Calcium is also mobilized from the skeleton, which can lead to bone loss (24) and thus increases the risk of fractures. Consequently, to prevent fractures in elderly people previous and existing guidelines (25) adequate intake of calcium is recommended. In the current study the calcium intake is high as the person changes. As they have dental problems, increased milk and milk products when consumed can help to consume and swallow food more easily, thus providing adequate calcium. Consequently, some experts have recommended that older people increase their calcium intake through their diet and take supplements only when that is not feasible (26). The RDA for iron is 17 mg for women and 21 mg for men (19). Absorption of Fe depends on the form of Fe (haem or non-haem) and the presence of factors enhancing or inhibiting absorption like vitamin C and phytate (27). As the person ages, various physiological changes occur which can cause reduce absorption of Fe. In the study, only 17% of elderly in the age 60-70 years, while as the age increases the person does not meet the iron intake.

Gastrointestinal problems especially constipation is the most common problem in elderly. The recommended amount of fiber for women is 38 mg and for men it is 34 mg (36). The intake of fiber in the elderly is crucial as the amount of fiber consumed helps to improve various conditions such as CVD (28), diabetes and constipation. Increasing dietary fiber significantly reduces the risk of gaining weight and fat in women (29). Higher intakes of cereal fiber, particularly from whole-grain sources, are associated with lower total percent body fat and percent trunk fat mass in older adults (30).

Physical activity has a fundamental role in the prevention and treatment of chronic disease (35). Declining physical function in elderly is associated with institutionalization, morbidity and mortality (31).In this study, there was a positive relationship between physical activity and age i.e. as the age increased the prevalence of physical activity also increased in this population. This could be due to increased awareness about physical fitness and more consciousness towards health and fitness as the age increased in the elderly population. Though further studies are required to understand the relationship of physical activity and increasing age. Although monitoring trends and evaluate public health or individual interventions aiming at increasing levels of physical activity, reliable and valid measures of habitual physical activity are essential (32). Functional based exercise should be a focus for interventions to protect older, high-risk people from falling and to improve and maintain functional capacity (33). Increasing physical activity is a key component of recommendations to decrease morbidity and mortality (34).

Limitations

There are few limitations in this study. Although this study allowed to examine the relation of individual characteristics and health-related factors in assosciation to nutrient intakes, casual inferences were unable to make. Since this study was aimed principally on nutritional status, a larger sample size along with identification of other factors with greater detail would have been more beneficial. Also the amount of nutrient intake was directly related to the dietary recall of the subject. Thus, accuracy and the amount of food intake was directly related to the persons recall and memory. There may be a possibility that the person may over exaggerate the food consumed or may hide any other unhealthy food pattern.

CONCLUSION

Dietary intake and physical activity status is very low in the elderly population in Mumbai city. Public health programs and

community out-reach programs need to be planned to improve appetite, dietary intake and physical activity status of elderly.

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