Original Article

Comparative Evaluation of Nutritional Status of Elderly Dentulous, Denture Wearing and Completely Edentulous Patients - In Vivo Study

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Abstract

Objective: Elderly denture wearers are vulnerable to compromised nutritional health due to various factors. Dietary guidance is an integral part of treatment for denture wearers. Evaluation of nutritional status is important for any nutrition or dietary modification. The purpose of this comparative study was to evaluate the nutritional status of elderly dentulous, denture wearing and completely edentulous patients.

Methods: 120 healthy Male and Female patients between the ages of 40 to 80 years were selected and divided into three sample groups. All three groups are made to answer two forms that is Mini nutrition assessment tool (MNA) form and food frequency form.

Results: According to food frequency form, 41/44 and 40/40 of dentulous and denture wearing patients respectively have roti whereas only 33/36 of edentulous patients have roti; 44/44 and 40/40 of dentulous and denture wearing patients respectively have rice and only 29/36 of edentulous patients have rice. According to mini nutritional assessment, 63.9% of the edentulous subjects were either malnourished or at the risk of malnutrition; 90% of denture wearing patients had normal nutritional status; and very minute difference of 90.9% of dentulous patients with normal nutritional status.

Conclusion: Tooth loss and denture wearing, both of which affect many Indians as they age, are associated with a decrease in dietary adequacy.

Keywords: Dentulous, Denture, Diet, Edentulous, Food Frequency Form, Mini Nutritional Assessment

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INTRODUCTION

India has acquired the label of aging nation with 7.7% of its population being more than 60 years old.[1] There has been a sharp increase in the proportion of elderly population in India as a result of demographic transition.[1] It is a much accepted fact that there exists some relationship between health of oral tissues and general health as the age progresses.[2] Absence of teeth affects the health of oral tissues and the body in a huge way by altering the quality of life along with nutrition and food habits.[2]

Nutritional well-being plays a major role in health promotion and maintenance in older people; thus, it is important to identify the main determinants of nutritional status in the elderly population. Dietary habits, food intake and oral health changes are important factors, but their reciprocal effects and relationships with overall nutritional status are complex and controversial.[3]

Various factors which may be responsible for the change in one's diet in old age include social isolation, living alone, limited income, lack of mobility, dental problem, diminished taste acuity, food faddism and presence of chronic diseases. Evaluation of nutritional status is important for any nutrition or dietary modification.[4] Therefore,

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the comparative study of evaluation of nutritional status of elderly dentulous and completely edentulous and edentulous patients wearing complete denture was undertaken.

MATERIAL AND METHODS

Sample selection: A total of 120 healthy male and female patients between the ages of 40 to 80 years attending the OPD of Department of Prosthodontics, Sharad Pawar Dental College and Hospital, Sawangi (M), Wardha, Maharashtra, India were selected and divided into three sample groups subject to the inclusion and exclusion criteria.

Inclusion criteria: Age: Between 40- 80 years, Subjects without minor diseases like common cold, fever in last 15 days were selected, Subjects with no natural teeth were taken as edentulous samples. Subjects who reported wearing maxillary and mandibular complete dentures for at least 6 months were taken as the denture wearing sample. Subjects with at least 24 teeth who do not wear dentures were taken as dentulous sample.

Exclusion criteria: Patients diagnosed with major systemic diseases affecting the diet pattern or intake (eg: cardiovascular and cerebrovascular diseases, diabetes mellitus, renal diseases oral cancer etc.), patients with any condition that could impair normal nutritional intake (eg: xerostomia, dysphagia), patients with reported food allergies, patients with poor quality dentures or those with poor retention, stability, or support, patients with Temporomandibular joint dysfunction, patients with severe attrition of natural teeth and patients with periodontal conditions which might hamper masticatory efficiency.

Sample groups

Group 1: Sample group of patients who are completely edentulous.

Group 2 : Sample group of patients who are wearing denture for at least 6 months.

Group 3: Sample group of patients who are dentulous with at least 24 teeth and do not wear dentures.

All three groups are made to answer two forms that is Mini nutrition assessment tool (MNA) form and food frequency form.

Food Frequency: (Form 1) The food frequency approach asks respondents to report their usual frequency of consumption of each food. Overall nutrient intake estimates are derived by summing over all foods. FFQs provide information on consumption of queried foods and beverages over the specified period.

1. Depending on the breadth of items queried, data can be used to assess total dietary intake and/or particular aspects of diet.

Food frequency form: (FORM 1)

Please put a tick on the box to indicate how often, on average, you have eaten the specified amount of food during the past year.

Food and amounts	Average use last year								
Food groups	Never or less than once/month	1-3 per month	Once a week	2-4 per week	5-6 per week	Once a day	2-3 per day	4-5 per day	6+ per day
	1	2	3	4	5	6	7	8	9
Roti									
Rice									
Green leafy vegetables									
Fruits									
Milk and milk products									
Non veg food									
Condiments and spices									
Sugars									

1-5 : Not Frequently

6-9 : Frequently

Mini Nutritional Assessment MNA (FORM 2)

NAME:

AGE:

SEX:

HEIGHT, IN CM:

WEIGHT, IN KG:

A. Has food intake declined over the past 3 months due to loss of appetite, digestive problems, chewing or swallowing difficulties?

0 = severe decrease in food intake 1 = moderate decrease in food intake

2 = no decrease in food intake

B. B. Weight loss during the last 3 months

0 = weight loss greater than 3 kg (6.6 lbs) 1 = does not know 2 = weight loss between 1 and 3 kg (2.2 and 6.6 lbs) 3 = no weight loss

C. Mobility

0 = bed or chair bound 1 = able to get out of bed / chair but does not go out 2 = goes out

D. Has suffered psychological stress or acute disease in the past 3 months?

0 = yes 2 = no

E. Neuropsychological problems

0 = severe dementia or depression 1 = mild dementia 2 = no psychological problems

F1. Body Mass Index (BMI) (weight in kg) / (height in m)^2 0 = BMI less than 19 1 = BMI 19 to less than 21 2 = BMI 21 to less than 23

3 = BMI 23 or greater

Screening score
(max. 14 points)

12-14 points Normal nutritional status

8-11 points At risk of malnutrition

0-7 points: Malnourished

2. Depending on whether portion size is determined, information may represent either usual frequency of consumption only or total amount usually consumed.

3. FFQs may be better than short-term instruments (e.g., 24-hour dietary recall [24HR]) at assessing intake of episodically consumed foods because they attempt to directly capture usual intake over a period of time.

Mini Nutrition Assessment Tool (MNA) - MNA is a screening tool to help identify elderly persons who are malnourished or at risk of malnutrition. MNA is an excellent tool for the research setting. It may provide additional infor-

mation about the causes of malnutrition in persons identified as malnourished or at risk for malnutrition. The MNA was developed by Nestlé and leading international geriatricians. Well validated in international studies in a variety of settings, the MNA correlates with morbidity and mortality (Form 2).

RESULTS

In the present study out of total 120 patients evaluated, 11 (30.56%) were males and 25 (69.44%) were female among 36 edentulous subjects; while 25 (62.5%) were male and 15 (37.5%) were female among 40 denture wearing subjects; while 11 (25%) were male and 33 (75%) were female among 44 dentulous subjects (Table 1).

Table 1: Distribution of Subjects according to Gender

Group	Gender		Total
	Male	Female	
I	11	25	36
II	25	15	40
III	11	33	44
Total	47	73	120

In present study we have found that 45.45% of the dentulous subjects were obese while of 18.18% dentulous and 22.22% edentulous subjects belonged to the underweight category. Even though statistically insignificant, maximum subjects of the denture wearing group 52.5% belonged to overweight category (Table 2).

Table 2: BMI of Study Participants

Group	BMI				Total
	Under-weight	Normal	Over weight	Obese	
I	8	11	9	8	36
II	5	4	21	10	40
III	8	6	10	20	44
Total	21	21	40	38	120

According to food frequency form, 41/44 and 40/40 of dentulous and denture wearing patients respectively have roti whereas only 33/36 of edentulous patients have roti; 44/44 and 40/40 of dentulous and denture wearing patients respectively have rice and only 29/36 of edentulous patients have rice (Table 3).

According to mini nutritional assessment, 63.9% of the edentulous subjects were either malnourished or at the risk of malnutrition; 90% of denture wearing patients had normal nutritional status; and very minute difference of 90.9% of dentulous patients with normal nutritional status (Table 4).

Table 3: Food Frequency of Study Participants

	Group I (n 36)		Group II (n 40)		Group III (n 44)	
	Freq-uently (n)	Not Frequ-ently(n)	Frequ-ently (n)	Not Frequ-ently(n)	Frequ-ently (n)	Not Frequ-ently(n)
Roti	33	3	40	0	41	3
Rice	29	7	40	0	44	0
Vegetables	29	7	40	0	28	16
Fruits	0	36	7	33	15	29
Milk	32	4	40	0	39	5
Non-veg	0	36	0	40	3	41
Spices	32	4	0	40	18	26
Sugar	36	0	40	0	37	7

Table 4: Mini Nutritional Assessment of Study Participants

Group	Mini Nutritional Assessment			Total
	Malnou-rished	At risk of malnut-rition	Normal nutritional status	
I	4	19	13	36
II	0	4	36	40
III	0	4	40	44
Total	4	27	89	120

DISCUSSION

The dietary selection and the nutritional status of elderly individuals are related to four important factors: general health, socioeconomic status, dietary habits, and oral health status including masticatory function. These factors are mutually related, which means that the cause of a nutritional deficiency is normally multifactorial. The extent to which dietary habits may be influenced by masticatory function and oral health status, as well as whether prosthetic therapy may be beneficial to nutritional status, are examined in the present study.

Around the world, tooth loss is seen as being in direct relation to aging.[5] As edentulism prevails among the elderly population and the systemic alteration of aging itself, i.e xerostomia, muscular atrophy and loss of perception may have a negative effect on masticatory function and nutritional status, leading to rejection of some foods due to difficulty in chewing them.[5] The rehabilitation of these individuals with the complete dentures

therefore becomes imperative, considering the relevant interference in functions of the stomatognathic system and social, emotional and psychological factors, which may also interfere with the nutritional status of the individual.

The ability to chew a wide variety of foods of different textures and nutritional values is the principal benefit provided by the teeth. As tooth loss occurs, masticatory efficiency declines[5], and it is natural for humans to alter their dietary intake to compensate for the greater difficulty of eating certain foods.[6,7] Edentulous individuals report significantly more chewing difficulties than dentate people.[8] Harder and coarser foods such as fruits, vegetables and meats, which are typically major sources of vitamins, minerals and proteins, come to be regarded as difficult to chew. Consequently, a tendency to favor softer, more processed foods develops in the edentulous individuals. However, these latter foods are typically fairly high in fat and cholesterol content and may also be lacking in vitamins and minerals.

It was observed in this study that none of the edentulous subjects were taking fruits frequently against 15/44 of dentulous subjects taking it frequently and 7/40 of denture wearing patients taking it frequently. In the same way, while 3/44 of dentulous subjects were consuming non-veg food and none of the denture wearing/ edentulous subjects consumed them. This result shows the decreased inclination of edentulous subjects towards hard to chew food like raw fruits, non vegetarian food. (Table 3). Numerous studies have provided strong evidence of an association between diminished masticatory function and the amount of fruits, vegetables, meats and breads that individuals consume. Wayler and Chauncey[6] examined a sample of 814 subjects. After comparing the frequency of ingestion of hard and soft foods, along with their ratings of chewing difficulty, the researchers concluded that "shifts in food selection patterns result from impairments in masticatory ability and appear to depend on the degree of impairment." Brodeur[9] and others noted a significantly higher intake of fruits and vegetables in subjects with high masticatory ability than in a group with low masticatory ability, whereas Johansson[10] and others witnessed a noteworthy lack of intake of fruits, vegetables and fiber in a group of edentulous men.

There is a direct relationship between edentulousness and malnutrition. 90% of the dentulous subjects in our study were well nourished according to MNA having score from 12 to 14 against 35% of edentulous subjects. The risk of malnutrition was higher in edentulous as compared to dentulous subjects. Wearing dentures in these patients increased their nourishment scale 90% were well nourished in comparison to 35% of edentulous subjects. Only negligible portion was malnourished that was 10% (Table 4).

Under nutrition is common health hazards in our geriatric population. As per presumptive diagnosis according to BMI, the maximum subjects in all three categories belonged to over weight that is total 25% of dentulous and 20% of edentulous subjects and 52% of denture wearing subjects (Table 2)

The finding that tooth loss and denture wearing, both of which affect many Indians as they age, are associated with a decrease in dietary adequacy and has several implications for practicing dentists. First, this finding can be used in office education programs designed to encourage patients to maintain their teeth throughout life. Second, once tooth loss and denture replacement has occurred, these data suggest that patients should be directed to a registered dietician who can assist them in monitoring their diets more closely to ensure that a decrease in dietary adequacy, and ultimately decrease in both overall and dental health should not occur.

CONCLUSION

Tooth loss and denture wearing, both of which affect many Indians as they age, are associated with a decrease in dietary adequacy.

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