10.5005/jp-journals-10052-0111

ORIGINAL RESEARCH

Assessment of Awareness and Knowledge about Geriatric Nutrition in Complete Denture Patients of Western Maharashtra (Karad), India: A Clinical Survey

[1]Priya Vaswani, [2]Jeny Thomas, [3]Rakshith Guru, [4]Pronob Sanyal, [5]Ankur Prajapati, [6]Tushar Khandagale

ABSTRACT

Introduction: The science of geriatric nutrition is often a neglected entity in complete denture patients during aging. Dietary nutrition, if adequately met, not only fortifies energy, but also restores masticatory function, maintains physiologic tone of jaw musculature, and also prevents unwanted laxity that gradually sets in jaw muscles during senescence. This, in turn, enhances the efficiency of jaw muscles to better perform during procedural steps of denture fabrication. Objective is to evaluate knowledge and awareness on importance of dietary nutrition during complete denture therapy as well as assess the present dietary intake among completely edentulous subjects in Western Maharashtra (Karad).

Results: One-sample proportion test was employed and frequency distribution and descriptive statistics were calculated. Statistically significant values were obtained.

Conclusion: More than 50% of subjects who participated in the study under the age group of 60 to 70 years lack knowledge of the following: (a) Number of meals to be consumed daily, (b) number of glasses of water to be consumed daily, (c) diet to be followed during and after completion of complete denture treatment, and (d) jaw muscle exercises to be observed during and after therapy.

Keywords: Body mass index, Geriatric nutrition, Protein energy malnutrition in adults, Venn diagram for factors affecting geriatric nutrition.

How to cite this article: Vaswani P, Thomas J, Guru R, Sanyal P, Prajapati A, Khandagale T. Assessment of Awareness and Knowledge about Geriatric Nutrition in Complete Denture Patients of Western Maharashtra (Karad), India: A Clinical Survey. Int J Prev Clin Dent Res 2017;4(3):218-224.

Source of support: Nil

Conflict of interest: None

INTRODUCTION

Proper nutrition is essential for maintenance of health and comfort of body, both for general and oral health in particular. Nutrition is the science of how the body utilizes food to meet requirements for development, growth, repair, and maintenance.[1] With aging of tissues, debilitated dentition makes partial or complete correction of masticatory apparatus deemed crucial to attain adequate nourishment. Age-related medical problems compounded with inability to eat cause the elderly to be prone to malnutrition deficiencies.[2] Thus, a thorough understanding of oral health and its maintenance according to the nutritional requirements in compliance with dietary guidance are essential for management of elderly patients, particularly those who are receiving complete denture therapy. Malnutrition is common in the elderly; inadequate nutrition or unfavorable dietary habits significantly contribute to loss of muscle mass. For example, physiologic tone of muscle plays a crucial role in recording the maxillomandibular relationships. A proper nutritional assessment followed by institution of an appropriate dietary plan is often an ideal way to cope with malnutrition than merely instituting prosthetic therapy.[3] Due to multiple factors such lack of education, unavailability of resources, or mere negligence, present-day completely edentulous patients are neither assessed adequately on their dietary intake nor are they aware of importance of geriatric nutrition. Thus, the current dogma in dentistry should focus on providing adequately trained geriatric professionals, who will not only restore their oral health, but also consider their past and present eating habits. A geriatrically oriented dentist plays a crucial role as by the tact of his education, training, and lineal skills tends to impart the real perspective of dietary nutrition during aging that not only impacts the oral health of elderly, but general health as well. These elements fall into two domains: (1) Management of teeth and edentulous spaces as well as the delivery of supportive dental care; and (2) management of the psychological, physiologic, and nutritional aspects of aging. Attempts at the first domain will surely fail without understanding the second. These prerequisites can be collectively called pretreatment considerations.[4] This article gives an account of a questionnaire-based survey conducted to assess, analyze, and determine the knowledge of complete denture patients in geriatric nutrition in Karad population.

[1]Senior Lecturer, [2]Undergraduate Student, [3]Professor, [4]Professor and Head, [5,6]Postgraduate Student

[1-6]Department of Prosthodontics, Crown and Bridge, School of Dental Sciences, Krishna Institute of Dental Sciences, Deemed University, Karad, Maharashtra, India

Corresponding Author: Priya Vaswani, Senior Lecturer Department of Prosthodontics, Crown and Bridge, School of Dental Sciences, Krishna Institute of Dental Sciences, Deemed University, Karad, Maharashtra, India, Phone: +919833014506 e-mail: vaswani.priya577@gmail.com

MATERIALS AND METHODS

The survey was a questionnaire-based study wherein a total of 21 questions were framed on varied aspects of their present dietary intake. Criteria for inclusion were as follows: Completely edentulous patients who reported to the Outpatient Department of Prosthodontics, and also those who were at varied stages of denture fabrication for a period of 3 months (October to December 2016) at the School of Dental Sciences, Krishna Institute of Medical Sciences Deemed University, Karad, India, were included. An informed consent was obtained prior to their enrollment in the survey. A total of 100 patients with an age range of 60 to 70 years participated, of which there were 20 dropouts. The questionnaire was in the local language (Marathi) and constituted questions related to consumption of foodstuffs that are enriched with all the essential vitamins, minerals, and micronutrients that alter the physiologic tone of jaw musculature during aging in alliance with complete loss of teeth. In addition to this, questions regarding healthy practices of having meals, i.e., in the company of fellow members, number of meals per day, account of exposure to sunlight per day, as well as administration of drugs on account of systemic disease were interpreted. Figure 1 represents the questionnaire given to all participants for their responses. Obtained responses in the survey were statistically processed.

Statistical Analysis

All the data were entered into an Excel sheet (Microsoft Excel 2007) and analyses were performed using

Department of Prosthodontics, Crown and Bridge

विशेष आहार / पोषणाच्या पद्धती कवळी वापरणाऱ्या वयोवृद्ध लोकांसाठी बनवलेली प्रश्नावली

पेशंटचे नाव -

वय / लिंग -

व्यवसाय -

जुने / नवीन कवळी बनवलेली -

१) पुर्णकवळी घातल्यानंतर घ्यावयाच्या आहाराचे महत्त्व तुम्हाला माहीत आहे का?

हो ☐ नाही ☐

२) पुर्णकवळी घातल्यानंतर तुम्हाला व्यवस्थित खाता / चावता येते का?

हो ☐ नाही ☐

३) तुम्ही दिवसातून किती वेळा जेवन करता?

१) २-३ वेळा २) ३-४ वेळा ३) ४-५ वेळा ४) ५-६ वेळा

४) तुम्ही एकटेच जेवन करता का?

हो ☐ नाही ☐

५) तुम्ही मऊ / पातळ अन्नपदार्थ खाता का?

हो ☐ नाही ☐

६) तुम्ही मांस, मासे, अंडी अथवा अन्य कोणत्या प्रकारचा मांसाहार खाता का?

हो ☐ नाही ☐

७) तुम्ही एका दिवसात किती ग्लास पाणी पिता ?

१) १-२ ग्लास २) २-३ ग्लास ३) ६-९ ग्लास ४) १०-१२ ग्लास

८) तुम्ही मद्यपान करता का?

हो ☐ नाही ☐

करत असल्यास प्रमाण-

१) ९०-१८० मिली / दिवस २) १८०-२७० मिली / दिवस ३)२७०-७०० मिली / दिवस

९)तुम्ही सुर्यप्रकाशात बाहेर जाता का ?

हो ☐ नाही ☐

जात असल्यास किती मिनीटे / तास- _____

१०)तुम्ही कोणत्या प्रकारची औषधे - गोळ्या घेता का ?

हो नाही

घेत असल्यास कशासाठी ?_____

११) तुम्ही दुध अथवा दुधाचे पदार्थ खाता का ?

उदा. चीज, पनीर, लोणी, दही

हो ☐ नाही ☐

१२) तुम्ही वाटाणा, ओट, हरभरा, गहू, ज्वारी, बाजरी, मका, तांदुळ खाता का ?

हो ☐ नाही ☐

१३) तुम्ही हिरव्या पालेभाज्या खाता का ?

उदा. पालक, कोबी, कोथींबीर

हो ☐ नाही ☐

१४) तुम्ही संत्री, मोसंबी, लिंबू, टोमॅटो खाता का ?

हो ☐ नाही ☐

१५) तुम्ही आंबा, गाजर, पपई, भोपळा खाता का ?

हो ☐ नाही ☐

१६) तुम्ही शेंगदाणे खाता का ?

हो ☐ नाही ☐

१७) तुम्ही शाबुदाणा खाता का ?

हो ☐ नाही ☐

१८) तुम्ही मोड आलेली कडधान्य खाता का ?

हो ☐ नाही ☐

१९) याआधी पुर्णकवळीच्या उपचारासाठी इतर कोणत्या दंतवैद्याला भेट दिली आहे का ?

हो ☐ नाही ☐

२०) असेल तर त्यांनी पुर्णकवळीच्या उपचारा दरम्यान घ्यावयाच्या आहारा बाबत सल्ला दिला आहे का?

हो☐ नाही☐

२१) पुर्णकवळीच्या उपचारा दरम्यान करावयाच्या जबड्याच्या स्नायूंच्या व्यायामाबद्दल तुम्हाला माहीती आहे का?

हो☐ नाही☐

Fig. 1: Questionnaire in local language (Marathi)

Statistical Package for the Social Sciences trial version 17. One-sample proportion test was employed, and frequency distribution and descriptive statistics were calculated. The p-value set to 95% ($p < 0.05$) is statistically significant.

RESULTS

Table 1 represents the results of analysis with high statistically significant values. Graph 1 is a graphical representation of responses obtained.

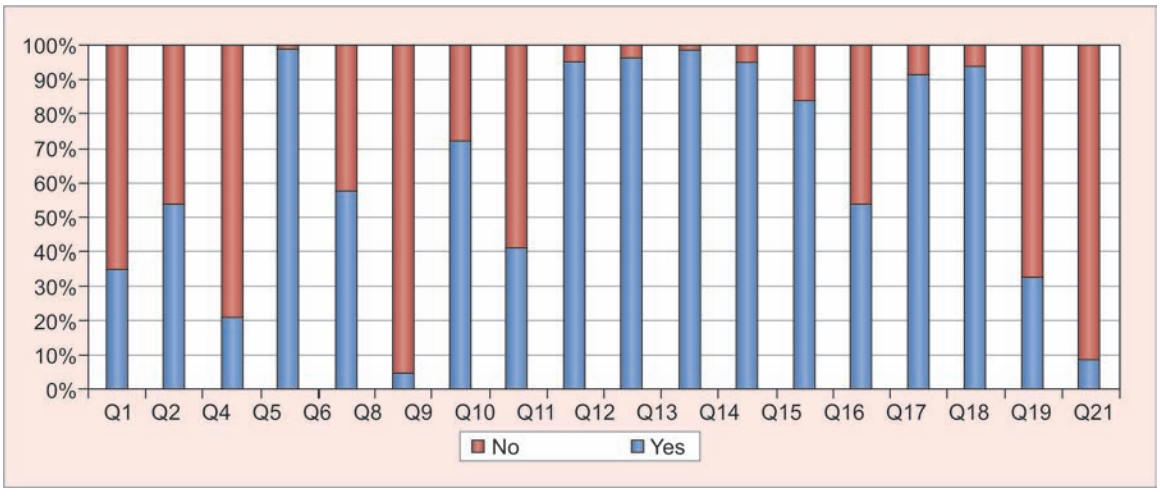
DISCUSSION

A healthy diet with enduring physical activity is an important equivalent to quality of adult life. A series of interdependent physiologic and psychosocial changes occur with age that critically impact nutritional status and general health of geriatric population. In addition to aging, ill-fitting prosthesis, poorly constructed dentures, and the resultant decreased chewing strokes can add to further deterioration of masticatory apparatus. As nutrition support improves the tolerance of oral mucosa, it

Table 1: Tabular Representation of Statistical data

Question no	*Yes (frequency %)*		*No (frequency %)*	*p-value*
1	28 (35%)		52 (65%)	0.007
2	43 (53.8%)		37 (46.3%)	0.502
3	2–3 times, 69 (86.3%)		3–4 times, 11 (13.8%)	<0.001*
4	17 (21.3%)		63 (78.8%)	<0.001*
5	79 (98.8%)		1 (1.3%)	<0.001*
6	46 (57.5%)		34 (42.5%)	0.180
7	2–3 times, 3 (32.8%)	6–9 times, 63 (78.9%)	10–12 times, 14 (17.5%)	<0.001*
8	4 (5%)		76 (95.5%)	<0.001*
9	58 (72.5%)		22 (27.5%)	<0.001*
10	33 (41.3%)		47 (58.8%)	0.118
11	76 (95%)		4 (5%)	<0.001*
12	77 (96.3%)		3 (3.8%)	<0.001*
13	79 (98.8%)		1 (1.3%)	<0.001*
14	76 (95%)		4 (5%)	<0.001*
15	67 (83.8%)		13 (16.3%)	<0.001*
16	43 (53.8%)		37 (46.35%)	0.502
17	73 (91.35)		7 (8.8%)	<0.001*
18	75 (93.8%)		5 (6.3%)	<0.001*
19	26 (32.5%)		54 (67.5%)	<0.001*
20	18 (22.5%)		62 (77.5%)	<0.001*
21	7 (8.8%)		73 (91.3%)	<0.001*

*Statistically significant



Graph 1: Representation of responses in frequency percentages

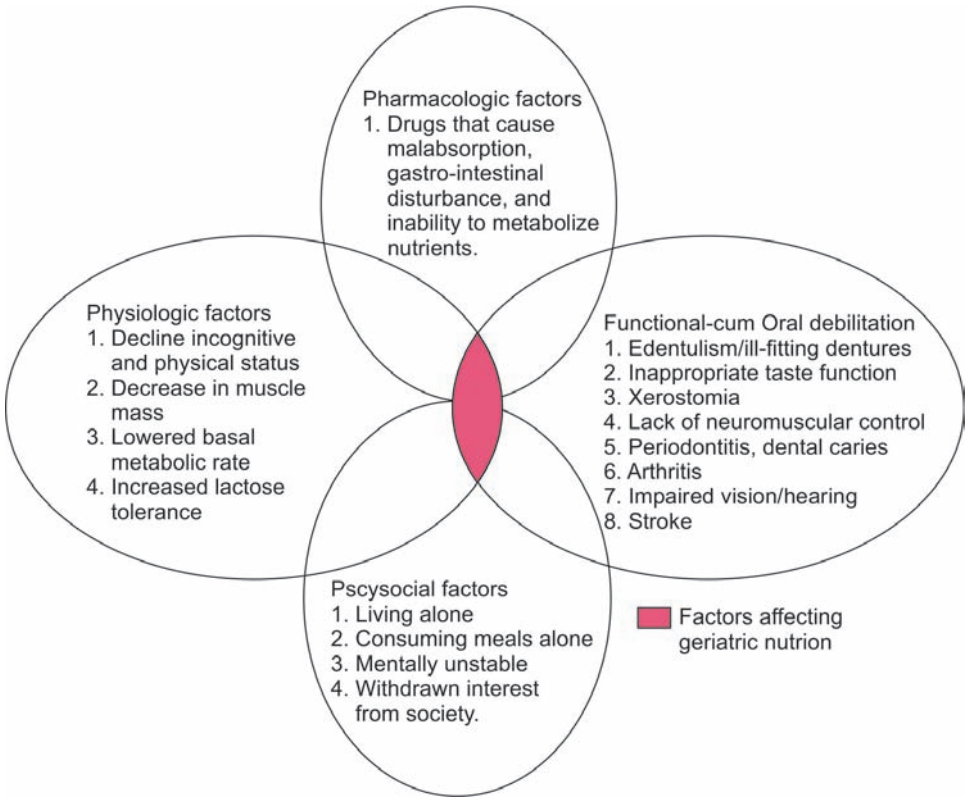


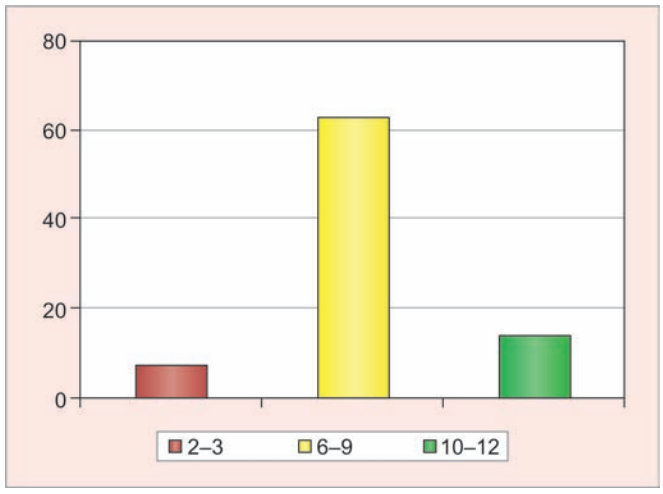
Fig. 2: Venn diagram for factors affecting geriatric nutrition

also maintains the physiologic tone of muscles, prevents laxity of tissues, and enhances better patient response during procedural steps. Inadequate nutrition on a long-term basis leads to multiple conditions, such as angular cheilitis, glossitis, slow tissue healing, and exacerbated amount of alveolar bone resorption due to low calcium and vitamin D intake. Causes toward negligence of dietary nutrition, when undergoing procedural steps of complete denture fabrication and during postinsertion of dentures, are lack of knowledge, unavailability of necessary food resources, and also languor that sets in from age-related systemic diseases. Signs and symptoms that are diagnosed during routine clinical examinations in the elderly are angular cheilosis/chelitis, glossitis, dermatitis, diarrhea, and memory loss indicating B-complex deficiencies. Lack of vitamin C results in delayed wound healing, while a generalized pattern of bone decalcification and muscular weakness may be related to lack of vitamin D.[2] Deficiencies of minerals like calcium, potassium, and magnesium may give rise to cardiac disturbances, muscle tremor, tetany, and postural hypotension. Atrophic buccal mucosa, anemia, and reduced resistance to infection may indicate depressed levels of iron, zinc, and copper. Vitamin K deficiency leads to bleeding problems, and impaired night vision may be indicative of vitamin A deficiency.[3] The clinical diagnosis of nutritional deficiencies should be correlated with biochemical and hematologic testing sometimes also suggesting underlying undetected systemic disorder. Geriatric nutrition is, therefore, influenced by multifactorial entities namely physiological, psychosocial, pharmacological, and functional-cum-oral debilitation. Figure 2 represents a Venn diagram for factors affecting geriatric nutrition.

A total of 80 subjects participated in the present study; 65% participants were unaware about soft diet, i.e., to be observed postinsertion. This is mainly to build up new memory patterns of chewing; further the tendency of dentures to tip will be reduced, thereby, providing psychological comfort. Quantity of diet in right proportions is equally important as its quality. In the present study, 86.3% reported that their rate of food consumption is twice-to-thrice per day. Social isolation, loneliness, or depression can lead to malnourishment. However, 79% of total subjects reported consuming their meals in the presence of their family members, bearing highly significant p-values (<0.001).

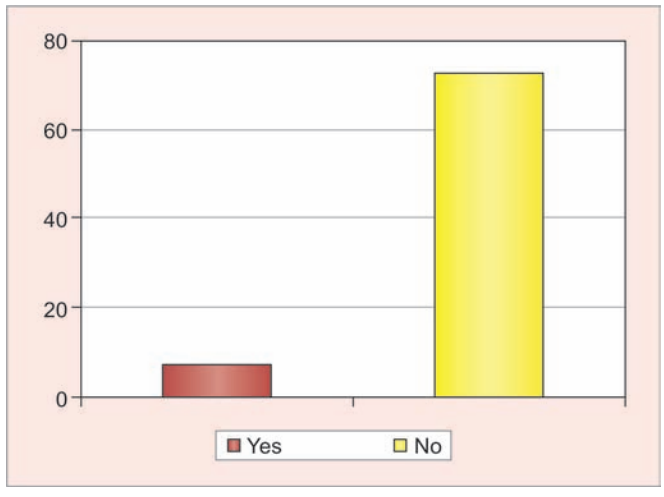
Consumption of organ meat, poultry, egg, fish, and fleshy foodstuffs replenishes the daily requirement of micronutrients. About 58% of total participants reported adequate intake of foodstuffs of animal origin; similarly, 96% of total subjects reported an inclusion of foodstuffs rich in cereals, pulses, legumes, wheat, jowar, and bajra fortified with macronutrients; intake of leafy vegetables was high as 98.8% of subjects suggested of diets having a balance between macronutrients and micronutrients. Water is necessary for good tissue resistance and resiliency. In our present study, Graph 2 depicts 79% of subjects as

Graph 2: Number of meals taken per day



Graph 3: Results showing number of glasses of water taken per day

reporting adequate daily consumption of water 6 to 9 times per day. Making a conscious effort to consume at least 8 glasses of water, juice, or milk daily is the most important measure to relieve dry mouth. As the ability to sense thirst is reduced in the elderly population, this leads to conditions like hypotension, elevated body temperature, and mental confusion when fluid intake is inadequate (Graph 3). Similarly, a recommended daily allowance of vitamin D is 5 µg/day obtained from fortified dairy products in order to minimize the risk of osteoporosis. A walk of 60 minutes per week or exposure to sunlight of hands, forearms, and face is sufficient for vitamin D synthesis. In the present study, 73% of subjects reported of 10 to 15 minutes of exposure to sunlight per week, which was below the desirable limit. Vitamin D is required for absorption of calcium from food, and, hence, important for alveolar bones and teeth. In addition to this, strength-training exercises twice or thrice per week, weight-bearing exercises, such as walking and 30 minutes or more of moderate physical activity preferably on all days of week improve muscle strength and coordination. Selected jaw-muscles exercises that are to be observed during procedural steps of complete denture therapy tend to strengthen the muscles and, in turn, maintain muscle tone during the clinical steps. In our present study, 92% of subjects were unaware of the jaw muscle exercises that one needs to carry out on daily basis as depicted in the graphical representation shown in Graph 4. Modest endurance training can improve cardiovascular and respiratory function and promote good muscle tone while controlling the accumulation of body fat. Most elders are generally prescribed over-the-counter medications daily. These drugs can interact with food and diet, sometimes with undesirable serious side effects. Over-the-counter prescriptions can affect absorption and utilization of some nutrients and vice versa. Prescribed drugs are the primary cause of anorexia, nausea, vomiting, gastrointestinal disturbances, xerostomia, taste loss,



Graph 4: Results showing awareness of jaw muscle exercises that are to be undertaken during procedural steps of complete denture

and interference with nutrient absorption and utilization thus, leading to malnutrition. About 59% of total subjects consumed no medications on a daily basis. The elderly have a decreased ability to absorb, distribute, metabolize, and excrete both prescription and nonprescription drugs. The majority of the elderly take more than one prescription drug, and these can interact with each other, affecting the nutritional status of the individual. Long-term use of certain therapeutic drugs that interfere with absorption and metabolism of nutrients is an important cause of malnutrition in the elderly.[5] Similarly, when alcohol is substituted for nutritious food, it may interferes with absorption of folic acid. In the present study, 5% of total participants reported of alcohol consumption. Vitamin C (antioxidant) requirements for geriatric people are the same as younger adults, and it maintains healthy tissue and enhances wound healing. The rich sources of vitamin C are fruits and vegetables. For geriatric patients with vitamin C deficiency, supplementary diet is very essential.[6] The present survey revealed 95% of total participants had

adequate daily consumption of foodstuff rich in vitamin C (citrus fruits) in their diet. According to Ettinger,[7] one of the factors culminating into geriatric malnutrition or undernutrition is lack of knowledge. Malnutrition or under nutrition or protein energy malnutrition (PEM), as such refers to a loss of weight and body tissues. This is classified into three broad categories, i.e., starvation, cachexia, and sarcopenia, which often overlap, especially in elderly subjects.[8] Starvation results from a pure deficit of all macro- and micronutrients. Sarcopenia describes the loss of skeletal muscle mass and function occurring in older or immobilized subjects. Finally, cachexia is a complex metabolic syndrome associated with underlying disease, characterized by a weight loss of at least 5% in 12 months.

There are many tools to assess the malnutrition in the elderly; however, assessment for medically compromised patients can be done with body mass index (BMI), which serves as an indicator of overnourishment and undernourishment. The Neurological Society of India-suggested BMI range is 22 to 27 (values outside this range indicate over- or underweight). The functional health status assessment tools, dietary reference intakes, and recommended dietary allowances along with activities of daily living help measure self-care ability (e.g. transferring, bathing, eating, toileting) along with Instrumental Activities of Daily Living (IADLs) and three of the following criteria: low fat free mass, decreased muscle strength, fatigue, anorexia, and abnormal biological markers (CRP > 5.0 mg/l, hemoglobin < 120g/l, serum albumin < 33 g/l).[9] According to this, patients who limit their food intake because of reduced masticatory function usually fall into the first two classes of PEM. Exceptions to this are cancer patients, who show signs of cachexia due to their underlying disease. Other consequences of PEM include low bone density, reduced cognitive functions, poor wound healing, and increased rates of hospitalization and mortality.[10]

Nutrition guidelines or diet chart for patients undergoing complete denture treatment or postinsertion of dentures to be observed is as follows[11]:

Breakfast	High-fiber breads and cereals, citrus fruits, and protein filled with energy for the day. Yogurt with berries, omelet, peanut butter
Lunch	Keeping body fuelled for the afternoon with red lentil, dhal, spinach, chick pea, curry, Yoghurt raita, leafy salads, rice or chapatti, banana, soft-cooked chicken, rice
Snacks	Choose almonds and raisins and fruits. Other smart snacks include milk product, apples and vegetables
Dinner	Vegetable salad, crusty brown bread and cheese, grilled salmon, etc.

The main objective of dietary counseling is to determine general adequacy of diet and diagnose specific nutrient deficiencies, more importantly, correct imbalances in nutrient intake. The PEM can be prevented from occurring particularly with general adequacy in diet. Nutrition care entails following steps[12]:

- Obtain a nutrition history and an accurate record of food intake over a 3- to 5-day period or complete a food frequency form.
- Evaluate the diet: Assess nutritional risk.
- Teach about the components of a diet that will support the oral mucosa, bone health, and total body health.
- Help patient establish goals to improve the diet.
- Follow-up to support patient in efforts to change food behaviors.

CONCLUSION

A thorough understanding of nutritional requirements, symptoms of malnutrition, and environmental factors that influence the choice of dietary intake is necessary. Hence, dietary guidance based on assessment in the initial phases of examination and diagnosis should be considered while formulating a comprehensive prosthodontic treatment plan. Within the limitations of this study, it can be concluded that

More than 50% of population in Karad Taluka of Western Maharashtra in the age group of 50 to 60 years lack knowledge in the following:

- Number of meals to be consumed daily
- Number of glasses of water to be consumed daily
- Diet to be followed during and after completion of complete denture treatment
- Jaw muscle exercises to be observed during and after therapy

REFERENCES

1. Rathee M, Singla S, Bhoria M, Kundu R. Role of nutrition assessment and dietary counselling in geriatric denture population – an overview. J Oral Health Res 2015 Feb;6(2):1-5.
2. Madan N, Bajaj P, Gupta S,Madan N. Nutritional Considerations For Geriatric Edentulous Patients. Internet J Geriatr Gerontol 2009;6(1):1-4.
3. Naik NR, Motwani BK, Sahu SK. Diet guideline for geriatric patient: a literature review. Int J Dent Health Sci 2015;2(2):385-395.
4. Iacopino AM, Wathen WF. Geriatric prosthodontics: an overview. Part 1. Pretreatment consideration. Quintessence Int 1993 Apr;24(4):255-266.
5. Bhayana R. Nutrition for geriatric patients. Int J Contemp Dent 2011;2(1):23-29.
6. Shiamala S. Nutrition and Metabolism in Geriatric Oral Health. Int J Scientific Res 2014 Apr;3(4)::495-497.
7. Ettinger RL. Changing dietary patterns with changing dentition: how do people cope? Spec Care Dentist 1998 Jan-Feb;18(1):33-39.
8. Jeejeebhoy KN. Malnutrition, fatigue, frailty, vulnerability, sarcopenia and cachexia: overlap of clinical features. Curr Opin Clin Nutr Metab Care 2012 May;15(3):213-219.

9. Evans WJ, Morley JE, Argilés J, Bales C, Baracos V, Guttridge D, Jatoi A, Kalantar-Zadeh K, Lochs H, Mantovani G, et al. Cachexia: a new definition. Clin Nutr 2008 Dec;27(6):793-799.
10. Donini LM, Poggiogalle E, Piredda M, Pinto A, Barbagallo M, Cucinotta D, Sergi G. Anorexia and eating patterns in the elderly. PloS One 2013;8(5):e63539.
11. Palmer CA. Gerodontic nutrition and dietary counseling for prosthodontic patients. Dent Clin North Am 2003 Apr;47(2):355-371.
12. Zarb, GA.; Bolender, CL. Prosthodontic treatment for edentulous patients. St. Louis (MO): Mosby publication; 2003; p. 56-70.