



# Impact of Partially Edentulous Spaces on Nutritional Status of Elderly Patients

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ABSTRACT

**Statement**

This study is done to create awareness among the elderly population about the risk of malnutrition due to unrestored edentulous spaces. Beside, this study also aims in relating the Kennedy's classification to the nutritional status of the elderly population in order to reduce the prevalence of malnutrition. Apart from that, this study may increase awareness among dental healthcare personnel in order to carry out early detection and prevention of malnutrition and enhance the individual general health status by improving dental health care.

**Methodology**

A survey was conducted upon seventy six elderly patients (39 women, 37 men) aged 50 and above to identify those who are malnourished or at risk of malnutrition. Patients were required to complete all questions in the MNA® in which the score is interpreted. Details of patient on the top of the form are obtained including name, gender, age, weight (in kg), height (in cm) and date of screen.

**Result**

According to our result, 7 out of 37 of male participants are at risk of malnutrition whereas 5 out of 39 female participants are at risk of malnutrition. Kennedy class IV partial edentulous arch have the highest risk of malnutrition followed by class II, class III and class I. Result also shows that patient with a partially edentulous upper arch have 23% chance of getting malnourish while patient with partially edentulous lower arch have a lower risk of malnourishment.

**Conclusion**

This study concluded that among Indians, the nutritional status is not greatly affected by their edentulous spaces. People with partially edentulous spaces have somehow found a way to continue their usual diet without compromising on their daily requirements of the proper nutrients.

**KEYWORDS**

Mini nutritional assessment, Partially Edentulous situations, Malnutrition

**Introduction**

Health, growth and development are defined to a large extent by an individual's diet and nutritional consumption. Regardless of age or culture, improper nutritional consumption can have negative effects on one's health.

Improper nutritional consumption in adults may lead to an increased risk of susceptibility to chronic diseases. It is therefore an absolute paramount to more efficiently leverage nutrition by personalizing intervention to better prevent and manage major chronic diseases. In addition, it is critical to develop and implement guidelines<sup>1</sup> that highlight the importance of proper nutrition and the role it can play in preventing specific health disorders.

Malnutrition affects people of all ages, but it is significantly more common in older people, and in an ageing population<sup>2</sup> the problem can only get worse. The older people commonly have missing teeth which implies impaired food consumption as they are unable to consume hard diet like meat as compared to fully dentulous individuals<sup>3</sup>. Often, the older people may have to compromise to soft diets in their daily meals which will lead to imbalance nutritional intake<sup>4</sup>. For example, lack of hard diet like meat may lead to deficiency of protein intake which eventually causes malnutrition. By classifying the edentulous spaces using Kennedy's classification, we can relate the types of edentulous spaces to the nutritional status of a person.

Currently, more than one in three patients in care homes<sup>5</sup>, and approximately the same proportion of elderly people living independently, are malnourished or at risk of malnutrition<sup>3</sup>. They

are hospitalized more frequently than healthy people and are three times more likely to pick up an infection<sup>6</sup>. This can have a particularly adverse effect on these people, impairing function, mobility and independence. By identifying patients who are malnourished or at risk of malnutrition, dental health officers are able to intervene, prevent or cease the progression of the malnutrition and provide adequate nutritional support thereby improving the nutritional status of the patient<sup>7</sup>.

**Kennedy's classification**

It is a method of classifying partially edentulous dental arches by Dr. Edward Kennedy in 1925, based on the location of the edentulous spaces in relation to the remaining teeth. It has four major categories:

Class I – Bilateral edentulous areas located posterior to the remaining natural teeth

Class II – Unilateral edentulous area located posterior to the remaining natural teeth

Class III – Unilateral edentulous area with natural teeth both anterior and posterior to it

Class IV – Single, bilateral edentulous area located anterior to the remaining natural teeth, the edentulous space must cross the dental midline

**What is the MNA®?**

The MNA® is a validated nutrition screening and assessment tool that can identify geriatric patients age 65 and above

who are malnourished or at risk of malnutrition. The MNA® is the most well validated nutrition screening tool for the elderly. Originally comprised of 18 questions, the current MNA® now consists of 6 questions and streamlines the screening process. The current MNA® retains the validity and accuracy of the original MNA® in identifying older adults who are malnourished or at risk of malnutrition. The revised **MNA® Short Form** makes the link to intervention easier and quicker and is now the preferred form of the MNA® for clinical use.

**Aims & objectives**

1. To evaluate the risk of malnutrition in elderly population due to unrestored edentulous spaces.
2. To relate the Kennedy's classification to the nutritional status of the elderly population in order to reduce the prevalence of malnutrition.
3. To assess the awareness among dental healthcare personnel in order to carry out early detection and prevention of malnutrition.

**Materials & Methods**

A survey was conducted upon seventy six elderly patients (39 women, 37 men) aged 50 and above to identify those who are malnourished or at risk of malnutrition.

Patients were required to complete all questions in the MNA® in which the score is interpreted. Details of patient on the top of the form are obtained including name, gender, age, weight (in kg), height (in cm) and date of screen. The MNA® consists of two parts: Screening and Assessment. In the Screening part, patients are required to complete the screen (questions A – E) by filling in the boxes with the appropriate numbers. The numbers are then added together to determine the screening score.

A score of 12 or greater indicates the person is well nourished and do not require further intervention. A score of 8 – 11 indicates the person is at risk of malnutrition. A score of 7 or less indicates the person is malnourished. Patients who scored 11 or less will continue the remaining questions in the next part, the Assessment part, for additional information on factors that may impact nutritional status. The total points from the Assessment section of the MNA® are obtained. Maximum score is 16 points. The full MNA® score is obtained by the addition of score from the screening section and assessment section which gives a maximum score of 30. A score of 24 – 30 indicates normal nutritional status; a score of 17 – 23.5 indicates patients at risk of malnutrition and patient scoring 17 points and below are categorized as malnourished.

**Inclusion criteria:**

This study included patients aged 50 and above, including free-living elderly, institutionalized, and hospitalized elderly populations. The patients are all first time denture prosthesis wearers.

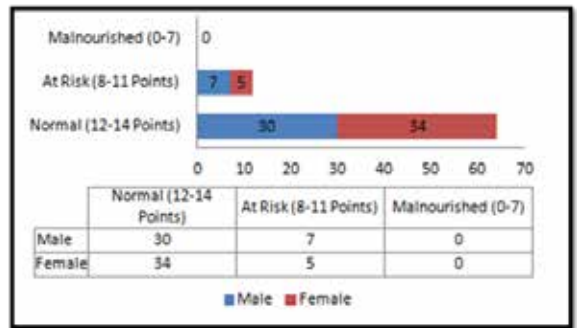
**Exclusion criteria:**

All patients who met the criteria participated in the study.

**Results & observations**

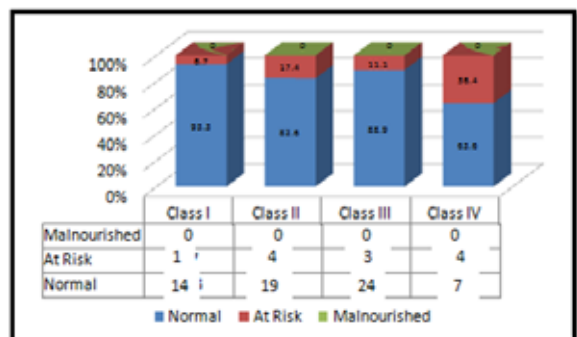
The data obtained are further analyzed and tabulated in the form of pie chart and bar chart. Firstly, we compared the results in terms of nutritional status between male and female patients. We also highlighted the relationship between nutritional status and the edentulous patient classified under Kennedy's classification of edentulous patient which is Class I to IV. Besides that, we analyzed the nutritional status of patient in relation to edentulous arches, whether it is maxillary arch or mandibular arch.

According to our result, 7 out of 37 (18.9%) of male participants are at risk of malnutrition whereas 5 out of 39 (12.8%) female participants are at risk of malnutrition. None of the participants regardless of the genders fall under the categories of malnourished (Chart 1)



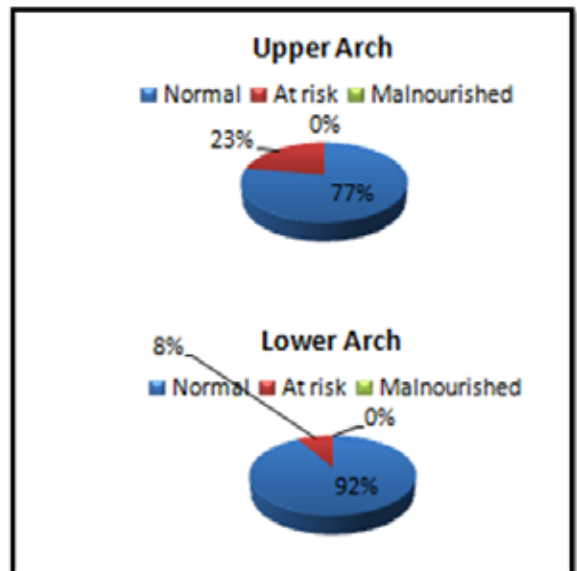
**Chart 1. Shows the comparison on nutritional status between Male and Female patient**

Result shows that participants with Kennedy class IV partial edentulous arch have the highest risk of malnutrition with the percentage of 36.4% followed by class II (17.4%), class III (11.1%) and class I (6.7%) (Chart 2)



**Chart 2. Shows the comparison on nutritional status of Kennedy class I, II, III and IV partially edentulous patient.**

Edentulous status on the maxillary and mandibular arches has an influence on the nutritional status of an individual. Result shows that patient with a partially edentulous upper arch have 23% chance of getting malnourish while patient with partially edentulous lower arch have a lower risk of malnourishment which is 8% (Chart3)



**Chart 3. Shows nutritional status of patient in-relation to the edentulous arches.**

## Discussion

We have conducted a study to gather data about the nutritional status of partially edentulous patients who are in the old age group. We restricted the survey to patients who have never worn dentures before. The reason we conducted this study is because we want to investigate the relationship between the number of edentulous space and nutritional status of a person.

Based on the study by Hutton B, Feine J & Morais J suggested that, masticatory function declines when there is significant tooth loss<sup>8,9</sup>. Patients tend to modify their dietary intake in order to have more ease when eating certain foods which pose higher difficulty. They usually prefer softer foods which are typically high in fat and cholesterol content but also lack vitamin and minerals which are required to have a healthy state of nutrition<sup>10,11</sup>.

A few studies had shown that there is an association between missing teeth and malnutrition within the past ten years<sup>12</sup>. However in our study, the relationship is not significant as there are no patients at malnourished state and only twelve patients are at risk of malnutrition. Among the twelve patients, 36.4% belong to the Kennedy's Class IV group. The highest percentage of patients with normal nutritional status belong to the Kennedy's Class I group and the lowest percentage is seen in the Kennedy's Class IV group.

Prior to this study, we hypothesise that the patients with Kennedy's Class I partially edentulous space will have the least percentage of normal nutritional status while the patients with Kennedy's Class III partially edentulous space will have the highest percentage of normal nutritional status. This hypothesis was made on the basis of the number of teeth and also the position of the remaining teeth. In Kennedy's Class III, the number of teeth is higher in comparison to

Kennedy's Class I. The edentulous space seen in Kennedy's Class III is bounded by anterior and posterior teeth however the edentulous space in Kennedy's Class I is only bounded by anterior teeth.

This hypothesis is not supported by our results due to various factors<sup>11</sup>. One of the factors is we did not specify the number of teeth missing in each Kennedy's classification. This made an impact in our results because even if a patient is missing a second molar on both sides of the arch, the patient's dental arch will still be classified as Kennedy's Class I. We theorise that the lowest percentage of normal nutritional status was seen in Class IV due to the missing anteriors leading to reduced cutting efficiency. Patients tend to believe that due to missing anteriors, they are unable to bite into food and encounter difficulties while eating. This leads them to choose softer food which and as we mentioned earlier, softer food lack vitamins and minerals.

Based on a study conducted by Waylor and Chauncey<sup>4</sup>, it was concluded that food selection depends on the masticatory ability of a patient and depends on the degree of impairment. In another study by Brodeur, patients with lower masticatory ability had reduced intake of fruits and vegetables<sup>13</sup>. However, while conducting this study, the patients have mentioned to us that they still maintain their usual diet even after losing their teeth. This could be due to the fact that they have developed their own methods of making hard food easier to consume by changing the way they prepare the food.

## Conclusion

This study concluded that among Indians, the nutritional status is not greatly affected by their edentulous spaces. People with partially edentulous spaces have somehow found a way to continue their usual diet without compromising on their daily requirements of the proper nutrients.

## References

1. Simko. Nutrition assessment: A comprehensive guide for planning intervention, 2<sup>nd</sup> Edition: Aspen Publication, 1995.
2. Kumar, Rastogi, Madan. Correlation between health and nutritional status in geriatric population: World Journal of Dentistry, October – December 2012; 3(4): 297-302.
3. Waylor AH, Muench ME, Kapur KK, Chauncey HH. Masticatory performance and food acceptability in persons with removable partial dentures, full dentures and intact natural dentition. J Gerontol 1984;39(3):284-9.
4. Waylor AH, Chauncey HH. Impact of complete dentures and impaired natural dentition on masticatory performance and food choice in healthy aging men. J Prosthet Dent 1983; 49(3):427-33.
5. Zini A, Slutzky H, and Vered Y: Intervention Plan for Improving Oral Health among the Elderly residing in the Community and in a Nursing Home: ME-JAA January 2013; Volume 10: Issue 1.
6. Colin Binns. Dietary guidelines for older Australians: NHMRC, 1999.
7. Kazemi S ,Savabi G, Khazaei S et al Association between food intake and oral health in elderly – Sepahan systematic review no. 8. Dent Res J (Isfahan). 2011 Dec; 8(Suppl1): 15–20.
8. Daly RM, Elsner RJ, Allen PF, Burke FM. Associations between self-reported dental status and diet. J Oral Rehabil 2003;30:964-70.
9. Brodeur JM, Laurin D, Vallee R, Lachapelle D. Nutrient intake and gastrointestinal disorders related to masticatory performance in the edentulous elderly. J Prosthet Dent. 1993 Nov;70(5):468-73
10. Cheung et al. Does chewing ability relate to oral health-related quality of life? : Community Dentistry DEN207Y; 2-23.
11. Linda Whitman. Improving dental & oral care services for nursing care facility residents: TRECS institute final report ,2005
12. Ross kerr. Nutritional Consequences of Oral Conditions and Diseases: Nutrition and Health 2005, pp 129-142.
13. Oral Health for Independent Older Adults: ADEA/GSK Predoctoral Curriculum Resource Guide, 2003.