INTRODUCTION

The primary function of teeth is mastication. To perform these functions, the jaws have powerful muscles capable of providing an occlusal force between the anterior teeth of 50 to 100 pounds and for the posterior teeth 150 to 200 pounds. The interdigitation of upper and lower dentition allows even small particles of food to be ground between the tooth surfaces.

The masticatory system is a functional unit composed of the teeth, their supporting structures, the jaws, the temporomandibular joints and the muscles. Mastication plays an important role both in the ingestion and initial digestion of food and in the perception of taste.

A number of factors may be related to the chewing ability including the state of dentition, biting force, dry mouth, swallowing ability, general health and psychological and social well being. Cross-sectional and longitudinal studies of elderly people reported that the clinical dental status, particularly the number of teeth and the number of posterior occluding pairs of teeth, was strongly associated with ability to eat certain foods.

ABSTRACT

Good diet is essential for the development and maintenance of healthy teeth, but healthy teeth are important in enabling the consumption of a varied and healthy diet throughout the life cycle. Tooth loss impairs chewing function and may result in the consumption of a limited diet of poor nutritional quality and may impact on diet-related quality of life. To be able to eat better is one of the main reasons for the provision of dental prostheses, the other reasons being aesthetics and speech. The objective of this study was to compare body mass index (BMI) of the patient before and after provision of complete denture therapy in a six months period. Seventy completely edentulous patients were included in this quasi – experimental study with age ranges between fifty five to sixty five years. Body Mass Index (BMI) was calculated at baseline, three and six month interval after provision of complete denture. Within the limitations of this study, no significant differences were found in BMI, before and after provision of complete denture.

Key words: Nutrition, Complete denture, Body Mass Index (BMI), Edentulism
The nutrition of an individual can be affected by several factors related to oral health which include partial or complete tooth lost or faulty prostheses. Quality of life is said to be affected by the loss of teeth. Tooth loss leads to decreased food intake resulting in compromised body mass index (BMI). Oral health related quality of life has been a topic of interest for past many years. In developed countries, individuals having poor oral health, as indicated by missing teeth, inaccurate prosthesis, low socioeconomic status, low levels of education and poor general health are found to have a low body mass index (BMI). According to World Health Organization (WHO), people living in the rural areas of Pakistan and those with lower socioeconomic status are reported to have poor oral health. Recent studies suggest that the risk of malnutrition is higher among elderly patients wearing complete denture and that limited nutritional intake is more likely to be related to compromised body mass index (BMI) than any other factor. Elderly patients are at a special risk for developing malnutrition and that the vulnerability to nutritional deficiency increases with age. Factors that contribute to nutritional problems in the elderly are changes in the ability to chew food due to inaccurate prostheses and certain systemic problems.

No such study regarding the comparison of body mass index (BMI) before and after provision of complete denture has been previously done in Pakistan. The aim of this study was to identify the impact of complete denture therapy on the body mass index (BMI) of edentulous individuals in Pakistan.

**METHODOLOGY**

This quasi-experimental study was carried out at the Department of Prosthodontics at the Armed Forces Institute of Dentistry (AFID) Rawalpindi, a tertiary care teaching hospital for undergraduates and post-graduates.

The inclusion criteria for this study were:

- Patients of both genders aged between 55 to 65 years.
- Patients requiring complete denture for the first time but have been edentulous for at least one year.

The exclusion criteria included the following conditions affecting BMI:

- Hypothyroidism or hyperthyroidism
- Hypertension
- History of any malignancy, radiation therapy or chemotherapy
- Malabsorption syndrome
- Ischemic heart disease
- Diabetes mellitus
- Oral or any swallowing problem
- Any underlying chronic medical condition

The study was approved by the ethical committee of AFID for medical research. Written informed consent was taken from the patients who fulfilled the inclusion criteria for the study.

Both male and female participants were included. After a detailed history and thorough clinical examination, patient’s height and weight was recorded. The patients’ body mass index (BMI) was calculated by dividing the weight in kilograms by the square of their height in square metres. Analysis of the body mass index (BMI) before provision of complete denture i.e. at the base line, then after the provision of complete denture fabricated with conventional technique at three and six months was done.

The data were analyzed using SPSS version 16. Mean standard deviation (SD) for numeric variables i.e. age, weight & height was calculated. Frequency and percentage (%) were presented for both genders. Paired sample t test was used to compare BMI three month and six month after the provision of complete denture. The arbitrary p value of less than 0.05 was considered significant.

**RESULTS**

A total of 70 patients were included in this study to compare body mass index before and after prosthetic rehabilitation with complete denture therapy within six months. There were 43 (61.4%) patients between 61 to 65 years of age and 27 (38.6%) patients between 56 to 60 years of age (figure 1). The average age of the patients was $61.54 \pm 2.26$ years (95% CI: 61.0 to 62.08). Average BMI at base line was $24.23 \pm 5.03$ kg/m² (95% CI: 23.03 to 24.42) (table 1).
Body mass index before and after provision of complete dentures

The mean BMI value was 24.23 ± 5.02 kg/m² before the provision of complete dentures and 24.21 ± 5.05 kg/m² at the three months follow up. The difference in the two values was not found to be statistically significant (p = 0.32).

The mean BMI value at the six months follow up was 24.21 ± 5.05 kg/m². The difference in the BMI value before the provision of the complete dentures and at

<table>
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<th>Variables</th>
<th>Mean ± SD</th>
<th>95%CI</th>
<th>Median (IQR)</th>
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<tbody>
<tr>
<td>Age (Years)</td>
<td>61.54 ± 2.26</td>
<td>61.0 to 62.08</td>
<td>62.08</td>
</tr>
<tr>
<td>BMI kg/m²</td>
<td>24.23 ± 5.03</td>
<td>23.03 to 23(10.5)</td>
<td>24.42</td>
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Out of the 70 cases, 44 (63%) were male and 26 (37%) were female with 1.69:1 male to female ratio as presented in figure 2.

A total of 35 (50%) patients were found to have normal BMI, 21 (30%) were overweight while 14 (20%) patients were found to be underweight.
Body mass index before and after provision of complete dentures

The six months follow-up stage was not found to be statistically significant (p = 0.32).

DISCUSSION

Oral health and dental status have a significant influence on the body mass index (BMI) of humans especially in the elderly. Dental status can have an impact on food choice and on the intake of key nutrients. Maintaining a healthy functional dentition has an important role to play in maintaining a healthy body mass index (BMI). Tooth loss is related to deterioration in general health which leads to reduction in physical, psychological and social capabilities.

Edentulism is thus a determining factor in the general health of the elderly people. Multiple other factors have also been associated with the inadequate intake of calories and nutrients. The widespread prevalence of tooth loss seen in the elderly population has a significant impact on impaired masticatory ability and food selection pattern, which is often overlooked. The relationship between body mass index (BMI), masticatory efficiency, diet and dental status have received considerable attention. There is a general agreement that decreasing the quality of natural dentition is associated with decreased masticatory efficiency. It is generally agreed in literature that masticatory efficiency in denture wearers is inferior to that with intact dentition. However, the present study did not find any significant impact of prosthetic rehabilitation on BMI.

A similar study was done by Gomes et al in 2006 in which 32 patients participated and there body mass index (BMI) was recorded in three different phases that is at the baseline, at three and then at six month intervals after prosthetic rehabilitation. The results revealed that analysis of body mass index (BMI) did not show any significant difference when compared with the three phases analyzed during the study.

In another study done by Sahyoun et al in 2003 in which edentulous elderly subjects had elevated Body mass index (BMI). The reason for this was that edentulism reduces the ability to chew; hence, edentulous individuals tend to eat foods high in calorie density which consequently leads to increase in weight. This fact is in accordance to the findings by Johansson et al (1994) that edentulous men and women were more obese and tended to have higher Body mass index (BMI) because they consumed more sweet snacks and less fruits, vegetables and fibres.

Another study done was conducted by Muller et al (2008) on the oral rehabilitation of patients with implant supported denture and conventional dentures. This study found that patients with conventional dentures had a significantly diminished masticatory ability as compared to patients with implant supported dentures.

A study by Walls AW et al (2000) demonstrated that reduced chewing efficiency is associated with decreasing number of teeth, removable partial dentures as compared with a similar number of natural teeth, and complete dentures as compared with natural dentition.

Masticatory efficiency in wearers of a complete denture has been found to be approx 80% lower than in people with intact natural dentition. People with one or two full dentures had the poorest chewing performance.

In the present study, the sample was collected only from patients at the Armed Forces Institute of Dentistry (AFID), Rawalpindi. It is recommended that a similar study should be carried out with a larger sample size in order to investigate any association...
between the provision of complete dentures and BMI in the Pakistani population. More diverse populations should be selected in future studies.

In general, it may be concluded that inadequate calorie intake and body mass index (BMI) were associated with functional dentition status. Hence, it is timely that oral health services to restore masticatory function are considered. Improved masticatory function consequently will improve their feeling of well being, self image, ability to communicate and to socialize, improve nutrition and ultimately the quality of life. Health professionals, nutritionists and dietitians should play an important role in educating the elderly people to improve their dietary intake in order to have a better quality of life.

CONCLUSION

Within the limitations of this study, no significant differences were found in BMI, before and after provision of complete denture. This does not mean that oral rehabilitation is not important in order to improve mastication and diet. This study did not find significant statistical differences in the BMI values before and after prosthodontic rehabilitation. Considering that one of the main reasons for seeking new dentures is nutritional problems, the dental clinic provide an opportunistic setting for dietary intervention that has largely been unexploited. The available data therefore indicate that although prosthetic rehabilitation results in improved chewing function, it does not provide sufficient drive to change what individuals eat; probably because dental function is just one of the many factors that influence food choice.

REFERENCES