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THE CORRELATION STUDY BETWEEN THE REMOVABLE PARTIAL DENTURES USAGE AND THE NUTRITIONAL STATUS OF ELDERLY PATIENTS AT THE USK DENTAL HOSPITAL BANDA ACEH - INDONESIA

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ABSTRACT

Introduction, aging is a process in which tissue begins to slowly lose its ability to repair itself and maintain its function. The aging process of the elderly is influenced by several factors, one of which is nutritional improvement. The large number of missing teeth that usually occurs in the elderly results in reduced chewing ability and affects a person's nutritional status. Lost teeth can be replaced by wearing dentures which can help patients restore the efficiency of their chewing abilities.

This study aims to determine the relationship between the use of removable partial dentures and the nutritional status of the elderly at the Dental and Oral Hospital of Syiah Kuala University, Banda Aceh. Methods, uses analytical with purposive sampling technique with subjects totaling 33 people. The results showed correlation between the use removable partial dentures and the nutritional status of elderly was 66.7%. Conclusion, there is no significant P 0,243 (P> 0.05) correlation between the use of removable partial dentures and the nutritional status of the elderly at the USK Dental Hospital, Banda Aceh.

Keywords: Elderly, Nutritional Status, Removable Partial Denture, Tooth Loss

1. INTRODUCTION

The elderly population is currently getting higher and estimated to have reached the number of children under the age of five. The World Health Statistics 2013 data states that 11% of the 6.9 billion people in the world are elderly. With an increase in the elderly population, the government needs to develop policies and

programs to help the elderly so that they can contribute to development and not burden the community Kiik et al. (2018).

The process of human growth and development starts from infants, children, adults and finally what is called the elderly. Aging is a process in which tissue begins to slowly lose its ability to repair itself and maintain its function. All the changes that occur in the elderly certainly affect their well-being. The aging process of the elderly is influenced by several factors, including improved nutrition, hygiene, improved health services, increased educational level, and increased socioeconomic level Friska et al. (2020).

Decreased organ function will decrease as a person age and will cause physical, psychological, environmental, and social life disturbances. Oral health problems in the elderly are related to nutrition, namely decreased organ function and physical disorders that can affect the absorption of nutrients by the body due to poor quality nutritional status Talib & Ramadhani (2015).

A balanced diet is necessary for the elderly to live a healthy and productive life and improve their quality of life. As you get older, the need for nutrients decreases due to having problems in terms of eating, namely decreased appetite. This will raise the risk of nutritional problems, including malnutrition and excess nutrition. One of the biological changes that occur in the elderly is the large number of teeth that fall out so that the ability to chew is reduced and consequently the nutritional status becomes poor Rusnaeni et al. (2018).

Tissue healing itself is lost slowly in the elderly, eventually unable to recover from infection and less able to repair damaged tissue Massie et al. (2016). Changes in the condition of the tissues in the mouth will cause the risk of tooth loss. Treatment used to restore normal masticatory function in the elderly is the use of dentures. Confidence in socialization will increase with the use of a prosthesis Wongkar et al. (2019).

The results of the 2018 Basic Health Research revealed that 19% of the second biggest dental problem in Indonesia is tooth loss due to extraction or self-knockout. The percentage of tooth loss was 29% in the 55-64 year age category and increased by 30.6% for the 65 year and over group. Periodontal disease is the main factor causing tooth loss in adulthood and can be more severe in the elderly if not treated immediately. Lost teeth can be replaced by wearing dentures which can help patients improve their appearance, restore their chewing ability, improve speech, maintain the condition of the surrounding tissues and jaws, and restore the mental health of the sufferer. The treatment used for teeth that are no longer there is treatment using a removable partial denture Halim et al. (2021).

Without immediate treatment in the elderly who lose their teeth, there will be tooth movement, loss of alveolar bone in the area where the teeth fall out, reduced chewing efficiency to language disorders. In addition, with few teeth, the elderly will complain of pain when chewing and cannot enjoy food. For this reason, prosthetic fabrication is essential in cases of missing teeth Thio (2014).

According to Windy et al. (2020), there is a link between partial tooth loss, quality of life, and nutritional status. The reason is that the posterior teeth are lost in contact, contributing to reduced occlusal forces, thereby reducing chewing ability. Restrictions on chewing make the elderly feel uncomfortable and have an impact on anxiety and psychology. As a result, the elderly are more susceptible to hypersensitivity which results in poor nutritional status and quality of life Hasibuan & Putranti (2021).

Based on the brief description above, the writer wanted to conduct research on the relationship between the use of removable partial dentures and the nutritional status of the elderly at the USK Dental Hospital, Banda Aceh.

2. RESEARCH METHODS

This study used an analytic cross-sectional design. The research will be conducted at the USK Dental Hospital, Banda Aceh from November to December 2022. The population in this study were all elderly patients at the USK Dental Hospital, Banda Aceh. The subjects in this study being elderly patients at the USK Dental Hospital with the inclusion criteria. Subject was taken based on the considerations of researchers with Purposive Sampling method. Ethics committee approval number 334/KE/FKG/2021 was approved by the Faculty of Dentistry, Universitas Syiah Kuala – Aceh.

Subject Selection and Examination

Subject selection first took the data from the registration section and records the patient's medical record number that using removable partial denture. The researcher will contact the patient and meet the patient at his residence. Furthermore, research subjects were asked to fill out an informed consent form. Then the subject was asked several questions and recorded on the examination sheet.

Subject Measurement

After recording the patient's personal data on the examination sheet, nutritional status was measured by measuring height and weight. Body weight was measured using a digital scale and height was measured using a stature meter.

Subjects who could not stand upright or who were sick were used a knee height caliper to measure their height. The height obtained is measured in cm and then converted using the Chumlea formula, namely:

1) Male height = 64,19 – (0,04 x age in years) + (2,02 x knee height in cm)

2) Female height = 84,88 – (0,24 x age in years) + (1,83 x knee height in cm)

Furthermore, knee height data using the Chumlea equation is included in the BMI formula:

$$\text{BMI} = \frac{\text{Weight}}{\text{Height}}$$

Researchers will provide education to patients regarding the importance of using removable partial dentures which will improve masticatory function and adequate nutritional intake and give rewards to the 33 subjects involved in the study.

2.1. DATA ANALYSIS

Data were analyzed using Microsoft Excel application and IBM Statistical Product and Social Science(SPSS) version 25 application.

3. RESULTS

The number of subjects in this study was 33 subjects with female subjects dominating than male subjects. There are five measurement results that are measured (gender, age, removable partial denture usage, tooth lose, and nutritional

status). The complete results of the primary data collected can be seen in the table below.

Table 1

Table 1 Frequency Distribution of Subjects by Gender

Gender	Amount	Percentage (%)
Man	8	24.2
Woman	25	75.8
Total	**33**	**100**

Table 2

Table 2 Frequency Distribution of Subjects by Age

Age Range	Amount	Percentage (%)
46-55 years (Early Elderly)	20	60.6
56-65 years (Late Elderly)	10	30.3
>65 years (Elderly)	3	9.1
Total	**33**	**100**

Table 3

Table 3 Frequency Distribution of Subjects by Tooth Loss

Tooth Loss Category	Amount	Percentage (%)
1-10 teeth	26	78.8
11-20 teeth	7	21.2
Total	**33**	**100**

Table 4

Table 4 Frequency Distribution of Subjects by Length of Removable Partial Denture Usage

Duration of Use Removable Partial Denture	Amount	Percentage (%)
6-12 months	3	9.1
>12 months	30	90.9
Total	**33**	**100**

Table 5

Table 5 Frequency Distribution of Subjects by Length of Denture Usage

Denture Usage	Amount	Percentage (%)
Upper Jaw	6	18.2
Lower Jaw	1	3.0
Upper Jaw and Lower Jaw	26	78.8
Total	**33**	**100**

Table 6

Table 6 Frequency Distribution of Subjects by Nutritional Status

Nutritional Status	Amount	Percentage (%)
Deficient	0	0
Normal	10	30.3

Over	23	69.7
Total	**33**	**100**

Table 7

Table 7 Frequency Distribution of Age, Gender, Tooth Loss by Nutritional Status

	Nutritional Status			Total
Category	**Deficient**	**Normal**	**Over**	
Age				
46-55 years (Early Elderly)	0	5	15	20
56-65 years (Late Elderly)	0	2	8	10
>65 years (Elderly)	0	3	0	3
Total	0	10	23	33
Gender				
Man	0	4	4	8
Woman	0	6	19	25
Total	0	10	23	33
Tooth Loss Category				
1-10 teeth	0	8	18	26
11-20 teeth	0	2	5	7
Total	0	10	23	33

Table 8

Table 8 Chi-Square Analysis Test of the Denture usage on Nutritional Status of the Elderly

	Nutritional Status			
Denture Usage	**Normal**	**Over**	**Total**	**P**
Upper Jaw	1	5	6	
Lower Jaw	1	0	1	0.243
Upper Jaw and Lower Jaw	8	18	26	
Total	**10**	**23**	**33**	

4. DISCUSSION

Elderly is a group of people with physical changes that look different from other age groups. Everyone will experience the process of growing old and old age is the last human life span Rizkillah et al. (2019). A person will experience physical, mental, and social decline to the point where they cannot perform their daily tasks. As getting older, the decay and loss of the teeth gradually increases, that make the most people in their old age are unhappy Senjaya (2017). Incomplete teeth can certainly reduce the comfort of eating and limit the types of food consumed. Loss of teeth is a sign of change in the elderly which causes difficulty in chewing food, so that reduced nutritional intake if do not replace lost teeth will affect nutritional status Gumayesty & Raviola (2021).

The number and distribution of the remaining teeth affect masticatory ability, food choices, and diet quality. Teeth have a function for mastication, speech, and aesthetics Zelig et al. (2022). The efficiency of mastication is affected by the presence of teeth and the use of dentures, which influence food choices. Impaired masticatory function will not only affect the health of the oral cavity but can also affect a person's general health because it is related to the choice of food consumed and has an effect on nutrition YaSu et al. (2020).

According to a study by Irene Suryani et al (2019) it shows that the number of posterior teeth remaining is associated with reduced nutritional intake in the elderly. Individuals with less than eight pairs of posterior occlusions have deficiencies of protein, potassium, calcium, vitamin A, vitamin D, vitamin B6, folate, and insignificant fiber intake Anggrek et al. (2019). Elderly who have at least 20 functioning teeth, this means that the masticatory function is close to normal, although it is slightly reduced. Likewise, the aesthetic function and speech function can still be considered normal with a minimum number of teeth of 20 Wahyuni et al. (2021).

Table 1 shows the distribution of the frequency of research subjects conducted on 33 patients who met the inclusion criteria who were treated at the USK Dental Hospital Banda Aceh., as many as 25 subjects (75.8%) were female and 8 subjects (24.2%) were male. Furthermore, Table 2 shows the frequency distribution of subjects based on age, there are 20 subjects (60.6%) aged between 46-55 years (Early Elderly), 10 subjects (30.3%) aged between 56-65 years (Late Elderly) and 3 subjects (9.1%) aged >65 years (elderly).

Table 3 shows the category of tooth loss with the most subjects in the category of losing 1-10 teeth by 78.8% while in the category of losing 11-20 teeth by 21.2%. Losing teeth can certainly reduce the comfort in chewing so that the elderly will limit the types of food consumed. This study shows that posterior tooth loss is more than anterior teeth, individuals with posterior tooth loss in several quadrants have a high prevalence of Temporomandibular Disorder Pioh et al. (2018). Good occlusion should allow the mandible without occlusal resistance during functional movements, especially in the posterior segment, so that the working side is not lost and the load distribution is more even Wardhana & Amalina (2015).

The duration of use may also affect the cleanliness of the dentures, from Table 4 it shows that 90.9% of the subjects wear dentures for more than 12 months. According to research conducted by Monang Panjaitan et al. (2020), it was found in the field that there were respondents who had used removable partial denture for more than ten months, but their dentures were still able to function properly because the respondents routinely cleaned their dentures and cared for them. Besides that, it can also be caused by a better adaptation factor in the denture therefore the respondent uses it longer Panjaitan et al. (2020).

Table 5 in the category of using dentures, using more dentures both in the upper and lower jaw due to experiencing partial tooth loss including the upper and lower jaw. Replacing missing teeth and meeting the dietary and nutritional needs of the elderly are very important for maintaining health and quality of life. Loss of teeth without replacement dentures means a severe loss of oral function, and this situation is common in poor populations in both developed and developing countries. The use of partial dentures to replace missing teeth and meet the dietary needs of the elderly is very important to maintain nutritional status Khoury et al. (2022).

Table 6 shows total of 10 subjects in this study had normal nutritional status (30.3%), 23 subjects had more nutritional status (69.7%) and no subjects were undernourished (0%). The results of this study are in line with the research conducted by Jessica Amanda et al, where the research conducted on 50 subjects showed that there were 27 subjects with more nutritional status than those with normal and undernourished status, namely 23 subjects Amanda & Labaron (2021).

Elderly with missing teeth who use dentures can optimize masticatory function. Because the elderly who experience tooth loss tend to change food from hard and

fibrous to soft and fatty so that it is easily digested resulting in excess body weight which can increase the risk of degenerative diseases because it is not accompanied by sufficient physical activity and exercise. Old age is the age when the greatest risk of developing degenerative diseases. Where disease is one of the factors that can affect the nutritional status of the elderly. The majority of the elderly in this study suffered from hypertension. One of the causes of hypertension is obesity. Therefore, the use of dentures can increase the nutritional intake of the elderly Skim (2021).

Table 7 on the age frequency distribution based on nutritional status shows that in the age category 46-55 years more experience more nutritional status than those in the age category 55-65 years and >65 years. Age is a factor that contributes to tooth loss. Along with increasing age, there is an increased risk of caries and periodontal disease which are the two main factors causing tooth loss therefore there is an increase in the percentage in the 46–55-year age category because more teeth are extracted Amanda & Labaron (2021).

Gender distribution based on nutritional status, no subjects were undernourished, 4 men with normal nutritional status and 4 men with more nutritional status, 19 more women with more nutritional status. According to research by Nurhidayati et al. (2021), the average elderly male has normal nutritional status compared to elderly female, because these differences can also be caused by differences in hormones in women which affect regulation of eating behavior and appetite regulation, thus affecting body metabolism Nurhidayati et al. (2021).

The distribution of the frequency of tooth loss based on nutritional status shows that 18 subjects with excess nutritional status have lost 1-10 teeth. Elderly who experiences tooth loss in large numbers tend to change food from hard and fibrous to soft and fatty so that it is easy to swallow, resulting in excess weight because consumption of fatty foods is not accompanied by sufficient physical activity and exercise. Low occlusal forces have been reported to result in decreased intake of vegetables, fruits, antioxidant vitamins and dietary fiber associated with intake of these nutrients. Fewer teeth result in lower occlusal forces and poorer masticatory ability Minakuchi et al. (2018).

Table 8 carried out an analysis test using the Chi-Square test to get a result of 0.243 which shows that statistically there is no relationship between the use of dentures and the nutritional status of the elderly. It is necessary to review each of these dimensions to see the effect of using denture in the elderly on each factor related to the nutritional status of the elderly. The results of this study are in contrast to Keiko Motokawa et al. (2021) which shows that there is a connection ween the use of dentures on the nutritional status of the elderly, where the effective use of dentures can increase the patient's nutritional intake and chewing ability Motokawa et al. (2021).

5. CONCLUSION

Based on the research results obtained, it can be concluded that there is no significant relationship with *P* value of 0.243 (P> 0.05) between the use of removable partial dentures and the nutritional status of the elderly at the USK Dental Hospital, Banda Aceh-Indonesia.

CONFLICT OF INTERESTS

None.

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REFERENCES

Amanda Putri, J., & Labaron, I. (2021). Overview of Nutritional Status in Patients with Partial Tooth Loss According to the Kennedy Classification : Study at Dental and Oral Faculty of Dentistry Usakti (Research). Journal of Integrated Dentistry, 2(2), 26-32. https://doi.org/10.25105/jkgt.v2i2.8789.

Anggrek, I. S., Nafisah, M., Masulili, C., Indrasari, M., & Ariani, N. (2019). Changes in Nutrition Intake and Nutritional Status of Pre-Elderly and Elderly After Denture Wearing. Journal of International Dental and Medical Research, 12(3), 1131-1135.

Friska, B., Usraleli, U., Idayanti, I., Magdalena, M., & Sakhnan, R. (2020). The Relationship of Family Support with the Quality of Elderly Living in Sidomulyo Health Center Work Area in Pekanbaru Road. JPK : Jurnal Proteksi Kesehatan, 9(1), 1-8. https://doi.org/10.36929/jpk.v9i1.194.

Gumayesty, Y., & Raviola, A. R. (2021). Relationship of Nutritional Status to Tooth Loss in the Elderly in Bangun Sar I Village Relationship of Nutritional Status Toward Teeth Loss in the Elderly in Bangun Sar I Village Relationship of Nutritional Status to Tooth Loss in the Elderly in Bangun Sari Village. Abdur Nursing Journal, 05(01), 24-28.

Halim, D. N., Wowor, V. N. S., & Wicaksono, D. A. (2021). Nutritional Status of Elderly Users and Non Denture Users. E -GiGi, 9(30), 217-222. https://doi.org/10.35790/eg.v9i2.34899.

Hasibuan, W. W., & Putranti, D. T. (2021). Relationship of Partial Tooth Loss to Nutritional Status and Quality Life at UPT Social Services for the Elderly in Binjai in 2020. Journal of Cakradonya Dental, 13(1), 72-80. https://doi.org/10.24815/cdj.v13i1.20916.

Khoury, C., Samot, J., Helmer, C., Rosa, R. W. et al. (2022). The Association Between Oral Health and Nutritional Status in Older Adults : A Cross-Sectional Study. Journal of BMC Geriatry, 22(1), 1-7. https://doi.org/10.1186/s12877-022-03133-0.

Kiik, S. M., Sahar, J., & Permatasari, H. (2018). Improving the Quality of Life of the Elderly (Elderly) in Depok City With Balance Exercises. Indonesian. Nursing Journal, 21(2), 109-116. https://doi.org/10.7454/jki.v21i2.584.

Massie, N. S. W., Wowor, V. N. S., & Tendean, L. (2016). Quality of Life for Elderly People who use Dentures in Wanea District. E-GiGi, 4(2). https://doi.org/10.35790/eg.4.2.2016.13651.

Minakuchi, S., Tsuga, K., Ikebe, K., Ueda, T., Tamura, F., Nagao, K., Furuya, J., Matsuo, K., Yamamoto, K., Kanazawa, M., Watanabe, Y., Hirano, H., Kikutani, T., & Sakurai, K. (2018). Oral Hypofunction in the Older Population : Position Paper of the Japanese Society of Gerodontology In 2016. Gerodontology, 35(4), 317-324. https://doi.org/10.1111/ger.12347.

Motokawa, K., Mikami, Y., Shirobe, M., Edahiro, A., Ohara, Y., Iwasaki, M., Watanabe, Y., Kawai, H., Kera, T., Obuchi, S., Fujiwara, Y., Ihara, K., & Hirano, H. (2021). Relationship Between Chewing Ability and Nutritional Status in Japanese Older Adults : A Cross-Sectional Study. International Journal of Environmental Research and Public Health, 18(3), 1-9. https://doi.org/10.3390/ijerph18031216.

Nurhidayati, I., Suciana, F., & Septiana, N. A. (2021). Nutritional Status Related to Elderly Quality of Life at Jogonalan Health Center. Main Scholar Journal of Nursing and Public Health, 10(2), 180. https://doi.org/10.31596/jcu.v10i2.764.

Panjaitan, M., Erawati, S., Nababan, I., & Putri, A. (2020). Impact of Using Removable Partial Dentures on Quality of Life in Patients. Journal of Prima Oral Dental Science, 3(1), 14-17.

Pioh, C., Siagian, K. V., & Tendean, L. (2018). The Relationship Between the Number of Missing Teeth and the Nutritional Status of the Elderly in Kolongan Atas II Village, Sonder District. E-GiGi, 6(2). https://doi.org/10.35790/eg.6.2.2018.21425.

Rizkillah, M. N., Isnaeni, R. S., & Fadilah, R. P. N. (2019). Effect of Posterior Tooth Loss on Quality of Life in the 45-65 Years Age Group. Journal of Dental Resident Students, 3(1), 7-12. https://doi.org/10.24198/pjdrs.v2i2.22135.

Rusnaeni, R., Azikin, M., & Umar, F. (2018). Correlation Between Full Denture Use and Nutritional Status in the Elderly in Tonrong Rijang Village, Baranti District, Sidrap Regency. Scientific Journal of Humans and Health, 1(3), 230-241. https://doi.org/10.31850/makes.v1i3.108.

Senjaya, A. A. (2017). Elderly Teeth. Husada Scale [Journal], 13(1), 72-81. https://doi.org/10.33992/jsh:tjoh.v13i1.76.

Skim, A. R. C. (2021). Correlation Between Nutritional Status and Degree of Hypertension in the Elderly in the Village of Rompiango, District of Lolak. Journal of Coping Community Public Nurses, 9(1), 46. https://doi.org/10.24843/coping.2021.v09.i01.p07.

Talib, B., & Ramadhani, K. N. (2015). Nutritional Status and Quality of Life in Elderly Used Complete Dentures in Makassar. MKMI journal. Prosthodontics, Faculty of Medicine. Hasanuddin University, 14, 44-49.

Thio, T. L. M. (2014). Patterns of Tooth Loss and the Need for Removable Partial Denture Care in Meras Village, Subdistrict. E-GiGi, 2(1), 2-4. https://doi.org/10.35790/eg.2.1.2014.4046.

Wahyuni, L. A., Nurilawaty, V., & Widiyastuti, R. (2021). Knowledge of the Causes and Impacts of Tooth Loss on Tooth Loss in the Elderly. Journal of Dental Hygiene Therapy, 2(2), 52-57. https://doi.org/10.36082/jdht.v2i2.335.

Wardhana, G. S., & Amalina, R. (2015). Elderly Individuals Study of Elderly Individuals in the Pucang Gading Social Rehabilitation Unit and the Harapan Wredha Home. Journal of Odonto Dental, 2, 40-45. https://doi.org/10.30659/odj.2.1.40-45.

Wongkar, V. T., Siagian, K. V., & Tendean, L. E. N. (2019). Quality of Life of Elderly Denture Users in Toulimembet Village, Kakas District. E-GiGi, 7(2), 106-112. https://doi.org/10.35790/eg.7.2.2019.25409.

YaSu, Y. M., Hirayama, K., & Sato, M. (2020). Denture Wearing and Malnutrition Risk Among Community-Dwelling Older Adults. Journal of Nutrients. (2020). YaSu, 12(1), 1-12. https://doi.org/10.3390/nu12010151.

Zelig, R., Goldstein, S., Touger-Decker, R., Firestone, E., Golden, A., Johnson, Z., Kaseta, A., Sackey, J., Tomesko, J., & Parrott, J. S. (2022). Tooth Loss and Nutritional Status in Older Adults : A Systematic Review and Meta-Analysis. JDR Clinical and Translational Research, 7(1), 4-15. https://doi.org/10.1177/2380084420981016.