Original Article
ISSN (Online): 2350-0530
ISSN (Print): 2394-3629

International Journal of Research - GRANTHAALAYAH
February 2023 11(2), 106–114

THE BEHAVIOR OF PATIENT WITH DIABETES MELLITUS WHO WEARING REMOVABLE DENTURE IN CARING FOR THE REMOVABLE DENTURES HYGIENE

Liana Rahmayani [1], Pocut Aya Sofya [1], Cut Fera Novita [2], Iin Sundari [3], Poppy Andriany [2], Raihan Putri Kahar [4]

[1] Department of Prosthodontics, Faculty of Dentistry Universitas Syiah Kuala
[2] Department of Dental Public Health, Faculty of Dentistry Universitas Syiah Kuala
[3] Department of Dental Material, Faculty of Dentistry Universitas Syiah Kuala
[4] Faculty of Dentistry, Universitas Syiah Kuala, Banda Aceh 23111, Indonesia

Received 03 January 2023
Accepted 02 March 2023
Published 10 March 2023

Corresponding Author

Liana Rahmayani,
liana.rahmayani@unsyiah.ac.id

DOI
10.29121/granthaalayah.v11.i2.2023.4870

Funding: This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

ABSTRACT

Diabetes mellitus has an oral manifestation condition known as xerostomia. Xerostomia is a dry mouth condition that may cause plaque accumulation in the oral cavity due to the absence of a protective function from saliva, this condition will increase the risk of caries, periodontal disease, and can cause tooth loss. Patients with diabetes mellitus who experienced tooth loss can be solved by wearing removable dentures that can improve articulation, mastication, and aesthetic functions. Patient with diabetes mellitus wearing removable denture must have good behavior to maintain the cleanliness of their oral cavitry and dentures. Behavior is a manifestation of a person's knowledge and attitudes. The purpose of this study was to observe the behavior of patient with diabetes mellitus wearing removable denture in caring for the hygiene of removable dentures. This research is descriptive by using questionnaire on google form. This research was done at Puskesmas Batoh Banda Aceh with total 73 subjects. The results of this study showed that behavior of people with diabetes mellitus with removable denture in caring for the hygiene of removable denture of knowledge was good, attitude was good, and action was good. The conclusion of this study shows that people with diabetes mellitus with removable denture have good behavior in caring for the hygiene of removable denture.

Keywords: Diabetes Mellitus, Xerostomia, Removable Denture Hygiene, Behavior

1. INTRODUCTION

Diabetes mellitus is an endocrine and metabolic disorder with an increasing prevalence and incidence Piero (2015). World Health Organization (WHO) states that diabetes mellitus is an epidemic. The number of diabetes cases in Indonesia in 2000 was 8.4 million people and is a expected to increase to 21.3 million people in 2030. Currently, Indonesia ranks 6th in the largest number of diabetes mellitus cases

in the world Navea Aguilera et al. (2015). Diabetes mellitus is a metabolic disorder characterized by chronic hyperglycemia caused by impaired of insulin secretion, insulin action in the body, or both Punthakee et al. (2018), Diabetes Dof. Diagnosis and Classification of Diabetes Mellitus. (2010).

Contributing factors of diabetes include genetics, obesity, diet, and elderly, so that diabetic patients who do not carefully control their blood glucose level will be at high risk of systemic and oral complications Eldarrat (2011), Sangam et al. (2015). Salivary flow in oral cavity of diabetic people is reduced or hyposalivation so that this will cause xerostomia. Xerostomia is a dry mouth condition which can cause plaque and debris accumulation in the oral cavity due to reduction of salivary flow, which lead to an increased risk of dental caries and periodontal disease which results in tooth loss and affects the masticatory process Eldarrat (2011), Imam (2012).

Diabetic patients who experience tooth loss need prosthesis to replaced missing teeth, besides that prosthesis can also improve phonetic, aesthetic functions, and are able to maintain the health of oral tissues. One of dentures type that can be used is a removable denture that can be readily removed and inserted by the patient Rahmayani et al. (2020).

Factors which must be considered when installing removable dentures are stability, support, and retention of the denture. The use of dentures in patients with diabetes mellitus requires several considerations, namely the presence of alveolar bone resorption, causing loss of denture retention. In addition, hyposalivation can also worsen denture retention. Hyposalivation can increase the growth of fungi such as *Candida albicans* (*C. albicans*) and bacteria so it will lead to the possibility of oral infection Hussain et al. (2010).

Pierre (2015) reported that the rate of growth of *C. albicans* in patients with diabetes mellitus who wear dentures is higher than in patients without dentures Le Bars et al. (2015). Continuous use of removable dentures in diabetic patient is associated in high prevalence of oral candidiasis, namely *C. albicans.* Considering the presence of xerostomia in diabetic patients wearing dentures, so there is an association between the presence of diabetes and denture stomatitis related with denture stomatitis Veiga et al. (2018).

Behavior is the activity of the individual concerned in carrying out an action, in this case is the behavior in caring for denture hygiene. Based on Erazo (2019), it is stated that people with diabetes mellitus who wear dentures require extra care in maintaining oral health due to continuous use of dentures and can cause oral lesions which often occur when oral hygiene is poor Erazo (2019). It is necessary to conduct research on the behavior of people with diabetes mellitus who wear removable dentures in maintaining the hygiene of removable dentures.

2. METHODS

The type of research used in this study is descriptive using a cross sectional design, namely research which measured and collected at one time.

The study is done from January–February 2022 at Puskesmas Batoh Banda Aceh. Determination of the subject in this study using purposive sampling method with the subjects are public society who wear removable dentures and people with diabetes mellitus who wear removable dentures who undergo treatment at Puskesmas Batoh Banda Aceh whose fulfill the inclusion criteria. Ethics committee approval number 334/KE/FKG/2021 was approved by the Faculty of Dentistry,

Universitas Syiah Kuala – Aceh. Determination number of the subject using the Slovin Formula.

After asking permission from the puskesmas to do research for 1 month at the puskesmas, then the researcher will ask the patient's willingness to fill out a subject selection form that will be distributed by the researcher as well as explain to the patient about this research. Patients who fulfill the inclusion criteria will be used as subjects in this study. Subjects who are willing will be asked to fill out an informed consent and questionnaire. If the subject has terms and things that are not understood, then subject can ask the researcher. After subject filled out the questionnaire, the researcher collected answer data for the data analysis process. Research subjects' answers in the form of "know", "agree", and "yes" will get a score of 2 and answers in the form of "don't know", "disagree", and "no" will get a score of 1 with 21 question items.

The criteria that are calculated based on the behavioral domain are knowledge, attitudes, and actions.

1) Good if the score is 8-14
2) Not good if the score is 1-7

The criteria that are calculated based on behavior

1) Good if the score is 22-42
2) Not good if the score is 1-21

3. RESULTS

This research was done in diabetic patients who wear removable dentures by giving a questionnaire using a google form. The distribution of the questionnaires took place from January to February 2022. The subjects in the study were 73 people. Research subjects who are willing to be asked to fill out a questionnaire containing questions about behavior in maintaining the cleanliness of removable dentures. The results obtained are as follows:

Table 1

Table 1 Frequency Distribution of Patients with Diabetes Mellitus Wearing Removable Dentures Based on Research Subject Data

Demographic Data	Frequency	Percentage
Gender		
Male	32	43,8%
Female	41	56,2%
Diabetic subject conditions		
Controlled DM	52	71,2%
Uncontrolled DM	21	28,8%
Removable denture types		
GTSL	67	91,8%
GTP	6	8,2%

Table 2

Table 2 Distribution of Subject Frequency Based on Behavior

	Category	
Behaviour (consist of knowledge, attitude, and action)	**Good**	**Not Good**
	72 (98,6%)	1 (1,4%)

Table 3

Table 3 Frequency Distribution of Subject Behavior Based on Behavioral Domain

	Category	
Behavioural Domain	**Good**	**Not Good**
Knowledge	71 (97,3%)	2 (2,7%)
Attitude	72 (98,6%)	1 (1,4%)
Action	71 (97,3%)	2 (2,7%)

Figure 1

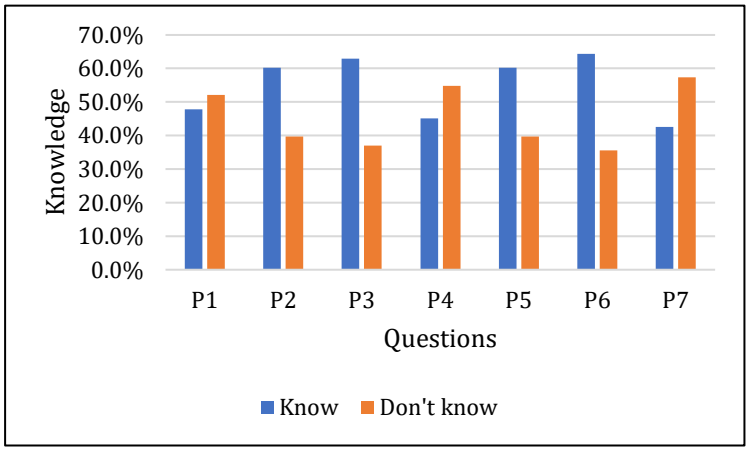

Figure 1 Frequency of Subject's Knowledge Based on Questions

Figure 2

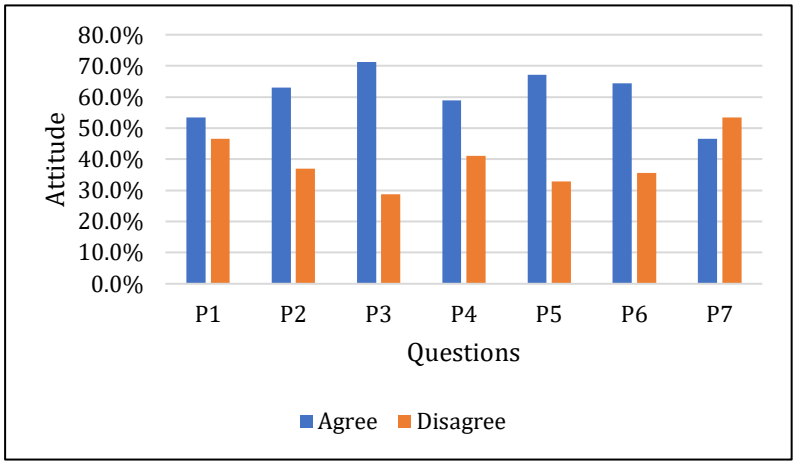

Figure 2 Frequency of Subject's Attitude Based on Questions

Figure 3

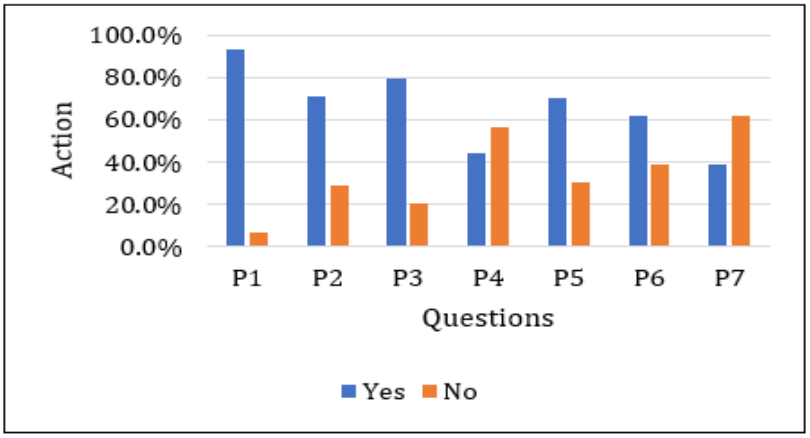

Figure 3 Frequency of Subject's Action Based on Questions

4. DISCUSSION

Patients with diabetes mellitus can experience problems with dental and oral health, namely caries and periodontal disease which can cause tooth loss. Conditions that can occur due to tooth loss include migration, rotation, aesthetic disturbances, and disturbances in articulation and mastication functions Nand and Mohammadnezhad (2022), Rantanen et al. (1980). Loss of teeth also causes empty space that can be overcome by the use of dentures. The use of dentures is a rehabilitative treatment that aims to replace missing teeth and to maintain the health of the surrounding supporting tissues Bonnet et al. (2016).

The results of the study in Table 1 show that there are more female subjects than male subjects. This is presumably because women have more care and concern for their condition. This result is in accordance with the research of Sapkota et al. (2013) which says that women have better behavior in maintaining health and are more aware of their appearance than men Sapkota et al. (2013).

Controlled diabetes mellitus patients in this study used removable dentures with a percentage of 71.2%. Routine control of blood glucose level is important for people with diabetes mellitus. According to research by Walukow (2013), people with diabetes mellitus with high blood glucose levels or hyperglycemia will allow xerostomia to occur. Xerostomia in people with diabetes mellitus can be characterized by a decrease in salivary flow, increasing the risk of caries and causing tooth loss Lima et al. (2017). The presence of hyposalivation can also reduce retention in dentures. Denture wearers generally have candida colonization on the denture surface which can be exacerbated if they have uncontrolled diabetes, so it is very important for diabetics to control glucose levels to reduce the occurrence of oral complications Rathee and Tamrakar (2014). The results of this study indicate that there are more controlled diabetes mellitus patients than those who are not controlled with the majority of research subjects aged >60 years (50.7%) who are categorized as elderly who still look active and are able to maintain blood sugar and maintain the cleanliness of their dentures. These results were proven in this study that the behavior in maintaining the cleanliness of removable dentures in patients with diabetes mellitus was included in the good category. This result is contrary to the research of Ozkan et al. (2011) which said that the elderly aged > 60 years lacked

sufficient knowledge and ability to maintain oral hygiene and dentures Ozkan et al. (2011).

The frequency distribution of subjects based on behavior in Table 2 shows that people with diabetes mellitus who wear removable dentures have a good category in maintaining the cleanliness of their dentures. This is because the subject already has a good knowledge and understands how to maintain the cleanliness of removable dentures. However, this result is not in accordance with the research of Apratim et al. (2013) which said that if most denture users did not pay attention to the cleanliness of their oral cavity, this was due to a decrease in ability due to old age Apratim et al. (2013).

Table 3 shows the frequency of the subject's answers based on the behavioral domain that can be measured from knowledge, attitudes, and actions. Good knowledge about how to maintain the cleanliness of removable dentures will result in a positive attitude in maintaining the cleanliness of removable dentures, thus providing a good influence which is manifested through the subject's actions Peracini et al. (2010). It is known that people with diabetes mellitus who wear removable dentures have actions on how to maintain the cleanliness of removable dentures in the good category. This result is not in accordance with research by Roshene et al. (2015) which says that most elderly denture users do not pay much attention to the cleanliness of their dentures, this is due to the lack of attention and instructions given by the dentist Roshene et al. (2015).

Figure 1 showed the frequency of research subjects' answers based on questionnaire questions about knowledge. Based on table 4, it is known that the research subjects who gave the most incorrect answers were the 7th question about dentures that must be removed at night when going to sleep and immersed in clean water with a total of 31 subjects (42.5%) who answered. These results are in accordance with the study of Bagaray et al. (2014) that most denture users do not know if they have to remove their dentures at night while going to sleep to reduce the possibility of denture fractures Peracini et al. (2010). This result is also in accordance with the research of Putri et al. (2017) who said that denture users do not understand the importance of removing dentures at night when going to sleep Van Waas et al. (1994). The use of dentures throughout the day can result in the accumulation of biofilm on the dentures so that it can increase the occurrence of denture stomatitis, therefore dentures must be removed at night to provide space for the mucosa to rest at night Patel et al. (2012). The sixth question was the question that received the most answers from the subjects, which indicated that most of the research subjects knew about removable dentures that were cleaned using a brush and soaked in a denture cleaning solution. This result is not in accordance with the research of Kaliey (2016) which says that most denture users do not know the importance of dentures needing to be soaked in a cleaning solution after cleaning with a brush Rahmayani et al. (2020).

Figure 2 showed the frequency of answers based on questions regarding the attitudes of research subjects. The third question got the most correct answers, namely regarding the growth of fungi and bacteria on the denture surfaces that are not kept clean. Dentures containing fungus can lead to further infection, especially in immunocompromised patients, such as diabetes mellitus, especially in diabetics with poor blood sugar control who are more susceptible to fungal infections Petrović et al. (2018). The seventh question is a question with many inappropriate subject answers. These results are in accordance with the level of knowledge of the subjects in this study regarding the subject's lack of understanding in terms of removing dentures at night and immersing dentures in water.

Figure 3 showed the frequency of research subjects' answers based on questionnaire questions regarding actions. Action is a manifestation of aspects of knowledge and attitudes. The results of the research obtained are included in the good category. Based on table 6, it is known that the research subjects who gave the most correct answers, namely the first question about paying attention to oral hygiene when using dentures, were 93.2% of the subjects. This is related to the research of Muluwere et al. (2015) which said that improper oral hygiene behavior can lead to easy plaque buildup so it is important to do cleaning Martori et al. (2017). The seventh question is the question with the most incorrect answers, which is about dentures that are not removed at night.

Behavior is measured based on a person's knowledge and attitudes. In this study, people with diabetes mellitus who wore removable dentures had behaviors that were included in the good category, but there were some subjects who still had poor behavior. Therefore, subjects who still have poor behavior need to be given further instructions and motivation regarding how to maintain the cleanliness of removable dentures.

5. CONCLUSION

Behavior consists of knowledge, attitudes, and actions. In this study, diabetes mellitus patients who wore removable dentures had knowledge that was in the good category, attitudes in the good category, and actions in the good category. Patients with diabetes mellitus who wear removable dentures have behaviors that are included in the good category regarding how to maintain the cleanliness of removable dentures.

6. SUGGESTION

Based on the results of the research that has been done, there are limitations in terms of the number of locations where the subject is taken, so the researcher suggests that further research needs to be carried out by taking subjects from various different locations. In addition, further research needs to be done by looking at the condition of the oral cavity and dentures of the subjects to see if the conditions are in accordance with the results of the study obtained.

CONFLICT OF INTERESTS

None.

ACKNOWLEDGMENTS

None.

REFERENCES

Apratim, A., Shah, S. S., Sinha, M., Agrawal, M., Chhaparia, N., and Abubakkar, A. (2013). Denture Hygiene Habits Among Elderly Patients Wearing Complete Dentures. Journal of Contemporary Dental Practice, 14(6), 1161-1164. https://doi.org/10.5005/jp-journals-10024-1468.

Bonnet, G., Batisse, C., Segyo, J. W., Veyrune, J. L., Nicolas, E., and Bessadet, M. (2016). Influence of the Renewal of Removable Dentures on Oral Health Related Quality of Life. Springerplus, 5(1), 2019. https://doi.org/10.1186/s40064-016-3699-7.

Diabetes Dof. Diagnosis and Classification of Diabetes Mellitus. (2010). Diabetes Care, 33(Suppl. 1). https://doi.org/10.2337/dc10-S062.

Eldarrat, A. H. (2011). Diabetic Patient : Their Knowledge and Perception of Oral Health. Libyan Journal of Medicine, 6(3). https://doi.org/10.3402/ljm.v6i0.5691.

Erazo, I. (2019). Complete Dentures and Diabetes Correlation, I.

Hussain, M., Yazdanie, N., and Askari, J. (2010). Management of Diabetes Mellitus Patients In Prosthodontics. J Pak Dent Assoc, 19(1), 46-48.

Imam, K. (2012). Management and Treatment of Diabetes Mellitus. Advances in Experimental Medicine and Biology, 771, 356-380. https://doi.org/10.1007/978-1-4614-5441-0_26.

Le Bars, P., Kouadio, A. A., N'goran, J. K., Badran, Z., and Soueidan, A. (2015). Relationship Between Removable Prosthesis and Some Systemics Disorders. Journal of Indian Prosthodontic Society, 15(4), 292-299. https://doi.org/10.4103/0972-4052.171828.

Lima, D. L. F., Carneiro, S. D. R. M., Barbosa, F. T. S., Saintrain, M. V. L., Moizan, J. A. H., and Doucet, J. (2017). Salivary Flow and Xerostomia in Older Patients With Type 2 Diabetes Mellitus. PLOS ONE, 12(8), e0180891. https://doi.org/10.1371/journal.pone.0180891.

Martori, E., Ayuso-Montero, R., Willaert, E., Viñas, M., Peraire, M., and Martinez-Gomis, J. (2017). Status of Removable Dentures and Relationship With Oral Candida-Associated Factors in a Geriatric Population In Catalonia. Journal of Prosthodontics, 26(5), 370-375. https://doi.org/10.1111/jopr.12551.

Nand, M., and Mohammadnezhad, M. (2022). Challenges Faced by Edentulous Patients (Edps) During Complete Denture Prostheses (CDP) Service Delivery in Fiji - A Qualitative Study. BMC Health Services Research, 22(1), 742. https://doi.org/10.1186/s12913-022-08136-6.

Navea Aguilera, C., Guijarro De Armas, M. G., Monereo Megías, S., Merino Viveros, M., and Torán Ranero, C. (2015). Relación Entre Xerostomía Y Diabetes Mellitus: Una Complicación Poco Conocida. Endocrinologia Y Nutricion: Organo De La Sociedad Espanola De Endocrinologia Y Nutricion, 62(1), 45-46. https://doi.org/10.1016/j.endonu.2014.09.004.

Ozkan, Y., Özcan, M., Kulak, Y., Kazazoglu, E., and Arikan, A. (2011). General Health, Dental Status and Perceived Dental Treatment Needs of an Elderly Population in Istanbul. Gerodontology, 28(1), 28-36. https://doi.org/10.1111/j.1741-2358.2010.00363.x.

Patel, I., Madan, G., Patel, B., Solanki, K., and Chavda, R. (2012). Behaviours and Hygiene Habits of A Sample Population of Complete Denture Wearers in Ahmedabad. Journal of International Oral Health, 4(2), 29-37.

Peracini, A., Andrade, I. M., Paranhos, H. F. O., Silva, C. H. L., and De Souza, R. F. (2010). Behaviours and Hygiene Habits of Complete Denture Wearers. Brazilian Dental Journal, 21(3), 247-252. https://doi.org/10.1590/s0103-64402010000300013.

Petrović, S. M., Barać, M., Pfićer, J. K., Radunović, M., Jotić, A., and Pucar, A. (2018). Presence of Different Candida Species at Denture Wearers With Type 2 Diabetes and Clinically Healthy Oral Mucosa-Pilot Study. Balkan Journal of Dental Medicine, 22(1), 15-21. https://doi.org/10.2478/bjdm-2018-0003.

Piero, M. N. (2015). Diabetes Mellitus - A Devastating Metabolic Disorder. Asian Journal of Biomedical and Pharmaceutical Sciences, 4(40), 1-7. https://doi.org/10.15272/ajbps.v4i40.645.

Punthakee, Z., Goldenberg, R., and Katz, P. (2018). Definition, Classification and Diagnosis of Diabetes, Prediabetes And Metabolic Syndrome. Canadian

Journal of Diabetes, 42(Suppl. 1), S10-S15. https://doi.org/10.1016/j.jcjd.2017.10.003.

Rahmayani, L., Sofya, P. A., Andriany, P., and Jingga, C. S. (2020). Oral Hygiene Behavior of Acrylic Removable Partial Denture Usage In Seuneubok District, West Aceh: A Cross-Sectional Study. Journal of International Oral Health, 12(2), 163-167. https://doi.org/10.4103/jioh.jioh_177_18.

Rantanen, T., Siirilä, H. S., and Lehvilä, P. (1980). Effect of Instruction and Motivation on Dental Knowledge And Behavior Among Wearers of Partial Dentures. Acta Odontologica Scandinavica, 38(1), 9-15. https://doi.org/10.3109/00016358008997714.

Rathee, M., and Tamrakar, A. (2014). Limited Prosthesis Wear in Geriatric Diabetic Edentulous Patients: A Social Morbidity. Journal of Social Health and Diabetes, 02(2), 112-113. https://doi.org/10.4103/2321-0656.130806.

Roshene, R., Robin, P., and Raj, J. D. (2015). A Survey of Denture Hygiene In Older Patients. Journal of Pharmaceutical Sciences and Research, 7(10), 897-900. https://doi.org/10.18535/jmscr/v3i9.01.

Sangam, S., Naveed, A., Athar, M., Prathyusha, P., Moulika, S., and Lakshmi, S. (2015). A Study on Functional Measures in Patients With Stroke. International Journal of Health Sciences and Research, 5(1), 156-164.

Sapkota, B., Adhikari, B., and Upadhaya, C. (2013). A Study of Assessment of Partial Edentulous Patients Based on Kennedy's Classification at Dhulikhel Hospital Kathmandu University Hospital. Kathmandu University Medical Journal, 11(44), 325-327. https://doi.org/10.3126/kumj.v11i4.12542.

Van Waas, M., Meeuwissen, J., Meuwissen, R., Käyser, A., Van Kalk, W., and Van 'T Hof, M. (1994). Relationship Between Wearing A Removable Partial Denture and Satisfaction in the Elderly. Community Dentistry and Oral Epidemiology, 22(5 Pt. 1), 315-318. https://doi.org/10.1111/j.1600-0528.1994.tb02059.x.

Veiga, N., Marques, T., and Monteiro, A. S. (2018). Oral Manifestations and Diabetes. Biomedical Journal of Scientific and Technical Research, 7(5), 6168-6171. https://doi.org/10.26717/BJSTR.2018.07.001574.