



RELATIONSHIP BETWEEN ORAL AND DENTAL HEALTH MAINTENANCE AND THE INCIDENCE OF PERIODONTITIS IN DIABETES MELLITUS PATIENS IN THE WORKING AREA OF UPTD PUSKESMAS (PUBLIC HEALTH CENTER) PAGUAT

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Abstract

Periodontitis is a condition that can occur in diabetes mellitus patients and is associated with poor maintenance of oral and dental health. This research aims to examine the relationship between oral and dental health maintenance and the incidence of periodontitis in diabetes mellitus patients. The research employs an analytical observational method with a retrospective design. The sample was selected using a purposive sampling technique. Data were collected using instruments measuring oral and dental health maintenance and a doctor's diagnosis to determine the presence of periodontitis. Analysis was conducted using the Fisher exact Test (p-value = 0,000). The results indicate a significant relationship between oral and dental health maintenance and the incidence of periodontitis in diabetes mellitus patients. Healthcare workers play a crucial role in educating on the importance of maintaining oral and dental health, including brushing teeth twice daily (morning after meals and before sleeping) and regularly visiting the dentist every six months.

Keywords : Diabetes Mellitus, Periodontitis, Oral and Dental Health Maintenance

Abstrak

Periodontitis merupakan penyakit yang dapat terjadi pada penderita diabetes melitus yang dikaitkan dengan kurangnya pemeliharaan kesehatan gigi dan mulut. Penelitian ini bertujuan untuk mengetahui hubungan pemeliharaan kesehatan gigi dan mulut dengan kejadian periodontitis pada penderita diabetes melitus. Metode penelitian menggunakan *Observational analitik* dengan desain *Retrospektif*. Pengambilan sampel dengan teknik *purposive sampling*. Data dikumpulkan menggunakan instrumen pemeliharaan kesehatan gigi dan mulut dan diagnosis dokter ada tidaknya periodontitis. Analisis dilakukan dengan Uji *Fisher exact Test* (p-value = 0,000). Hasil penelitian menunjukkan adanya



hubungan antara pemeliharaan kesehatan gigi dan mulut dengan kejadian periodontitis penderita diabetes melitus. Petugas kesehatan memiliki peran dalam memberikan penyuluhan tentang pentingnya menjaga kesehatan gigi dan mulut menyikat gigi 2x sehari pagi setelah makan dan sebelum tidur, rajin kontrol ke dokter gigi 6 bulan sekali.

Kata Kunci : Diabetes Melitus, Periodontitis, Pemeliharaan kesehatan gigi dan mulut

1. INTRODUCTION

Diabetes is a metabolic disorder characterized by high blood glucose levels (hyperglycemia) due to low insulin levels, insulin resistance (Hardianto, 2021). *The International Diabetes Federation* (IDF) reports that the percentage of diabetes sufferers in middle-income countries is 10.8% in 2021 and will increase to 13.1% in 2045.

IDF (2021), stated that in Indonesia, the estimated population of adult diabetes aged 20-79 years is 19,465.1 people. Meanwhile, the total adult population aged 20-79 years is 179,720.5 people, so the prevalence of diabetes in the age group between 20-79 years is 10.6%.

Data from the Gorontalo Provincial Health Office in 2022 showed that the number of diabetes sufferers was 18,074 people, spread across several regencies/cities. The highest number of diabetes sufferers was in Gorontalo Regency with 7,419 people, Boalemo Regency with 3,351 people, Bonebolango Regency with 2,418 people, Pohuwato Regency with 2,342 people, North Gorontalo Regency with 1,435 people, and the lowest was in Gorontalo City with 1,109 people. Data obtained from the Pohuwato Regency Health Office in 2023 showed several sub-districts with the highest number of diabetes sufferers. One of them is Paguat District. The Paguat Health Center showed that there were 287 people who came to check their health during 2023 with a diagnosis of diabetes.

The increasing prevalence of diabetes is accompanied by several micro and macrovascular complications in the body. People with diabetes with uncontrolled blood sugar often shows increased susceptibility against infection bacteria, mushrooms, and virus which are caused by immune response Which deviate as consequence from hyperglycemia And ketoacidosis Which altering macrophage and polymorphonuclear neutrophil chemotaxis which This can increase the cause of damage to periodontal tissue (Merdeka, 2018). Diabetes also often causes other manifestations in the body. oral cavity which includes saliva, tongue, mucosa, periodontal tissue, and teeth (Merdeka, 2018).

Periodontitis is a common oral health problem in diabetic patients characterized by early symptoms of gingivitis, but if not properly maintained it will end in periodontitis. Symptoms of periodontitis include increased probing depth, gum recession, and bone damage around the teeth (Rizkiyah et al., 2021).

The role of diabetes sufferers in maintaining dental and oral health is very important for the prevention and management of periodontitis. Some preventive measures to consider include Brushing your teeth twice a day with a toothpaste containing fluoride can help remove plaque and prevent the formation of tartar, which can lead to periodontal problems. Daily



flossing helps remove food debris and plaque from between teeth and below the gum line, areas where a toothbrush cannot reach. Regular dental check-ups by a dentist are essential to detect periodontal problems early and take necessary preventive or treatment measures. These steps not only help prevent diabetes-related complications but can also reduce morbidity rates due to oral manifestations such as gum infections and tooth decay (Rizkiyah et al., 2021).

Maintaining dental and oral health is very important, several oral and dental problems can occur due to lack of maintaining dental and oral hygiene. Some common dental and oral diseases that occur when ignoring dental and oral hygiene include bad breath (Halitosis), tartar/calculus, gingivitis, and dental caries. Awareness of maintaining dental and oral health is the right way to prevent dental and oral health problems (Tandriari 2016). Maintaining oral hygiene can be done in the most effective way by brushing your teeth regularly and at the right time, in order to break the cause of caries and various other oral diseases (Ministry of Health, RI., 2018).

Data from research conducted by Andrian (2023), Diabetes patients have good dental and oral health maintenance measures with no periodontitis disease totaling 17 people (65.4%). Meanwhile, respondents with diabetes who have poor dental and oral health maintenance measures with periodontitis disease totaling 33 people (75%). Periodontitis disease has been traditionally known solely as a consequence of diabetes.

Results initial observations based on interviews on 9 people sufferer diabetes in the working area of Paguat Health Center, 3 of the diabetics have bad behavior towards maintaining their dental and oral health including not brushing their teeth regularly, sometimes done twice a day but only done when taking a morning and evening shower, and the wrong tooth brushing technique and also not checking their dental and oral health regularly, only done if there are complaints either when they have a toothache or when a tooth is about to be pulled, 2 people complained of pain when chewing, there is tartar, bad breath, gaps between teeth, teeth are easily loose. And 2 of the diabetics have good behavior towards maintaining dental and oral health including diligently brushing their teeth twice a day after breakfast and before going to bed, 2 other people have no complaints about their teeth and mouth because they diligently check with the dentist.

Based on this description, the researcher wants to know Is there a relationship between maintaining dental and oral health? Periodontitis incident on Diabetes Sufferers in the Paguat Health Center Working Area.

2. RESEARCH METHOD

Research was conducted from November to December 2024. This research was conducted in the Working Area of the Paguat District Health Center UPTD. Pohuwato . This type of research is *analytical observational* research . With use *Retrospective* design . The population in this study were patients with diabetes in the working area of the Paguat Health Center UPTD, totaling 287 people .

In this study, the sample numbered 74 using the Slovin formula. The sampling technique in this study used *purposive sampling*.



3. RESULTS AND DISCUSSION

From all the respondents, a description of their characteristics is obtained in the following table:

Table 1 .1 Distribution of Respondent Characteristics by Age

No	Age	F	%
1	26-35 Years (Early Adulthood)	3	4.1
2	36-45 Years (Late Adulthood)	8	10.8
3	46-55 Years (Early Elderly)	23	31.1
4	56-65 Years (Late Elderly)	24	32.4
5	>65 Years (Senior Citizen)	16	21.6
Total		74	100

Source: Primary Data 2024

Based on table 4.1, it was found that from 74 respondents, the largest age group was 56-65 years with a total of 24 respondents (32.4%). The age classification above is categorized according to the Indonesian Ministry of Health (2008).

Table 1.2 Distribution of Respondent Characteristics by Gender

No	Gender	F	%
1	Man	19	25.7
2	Woman	55	74.3
Total		74	100

Source: Primary Data 2024

Based on table 4.2, it was found that of the 74 respondents, the largest gender was female with a total of 55 respondents (74.3%).

Table 1.3 Distribution of Respondent Characteristics by Occupation

No	Work	F	%
1	Housewife	24	32.4
2	ASN	22	29.8
3	Farmer	4	5.4
4	Self-employed	24	32.4
Total		74	100

Source: Primary Data 2024

Based on table 4.3, it was found that of the 74 respondents, the most common occupations were housewives and self-employed, with 24 respondents each (32.4 %).

Table 1.4 Distribution of Respondent Characteristics based on Education



No	Education	F	%
1	SENIOR HIGH SCHOOL	20	27
2	Diploma	31	41.9
3	Bachelor	23	31.1
Total		74	100

Source: Primary Data 2024

Based on table 4.4, it was found that of the 74 respondents, the largest education was a diploma with a total of 31 respondents (41.9 %).

Table 1.5 Distribution of Respondent Characteristics Based on Distance from Home to Health Facilities

No	Distance from Home to Health Facilities	F	%
1	<3KM	8	10.8
2	≥3 KM	66	89.2
Total		74	100

Source: Primary Data 2024

Based on table 4.5, it was found that of the 74 respondents, the largest distance was ≥3 KM with a total of 66 respondents (89.2 %).

Table 1.6 Distribution of Respondent Characteristics Based on Duration of DM Suffering

No	Long time suffering from DM	F	%
1	<5 years	13	17.6
2	5-10 years	47	63.5
3	> 10 years	14	18.9
Total		74	100

Source: Primary Data 2024

Based on table 4.6, it was found that of the 74 respondents, the longest period of suffering was 5-10 years with a total of 47 respondents (63.5 %).

Univariate Analysis

From the research that has been conducted, the distribution of respondents based on dental and oral health maintenance is obtained in the following table.

**Table 1.7** Distribution of Respondents Based on Dental and Oral Health Maintenance*Source: Primary Data 2024*

Based on table 4.7, it shows that the highest level of dental and oral health maintenance is good with 68 respondents (91.9%) and dental and oral health maintenance is moderate with 6 respondents (8.1%).

From the research that has been conducted, the distribution of respondents based on the incidence of periodontitis was obtained.

Table 1.8 Distribution of Respondents Based on Periodontitis Incidence

No	Periodontitis Events	F	%
1	There is	5	6.8
2	There isn't any	69	93.2
Total		74	100

Source: Primary Data 2024

Based on table 4.8, it shows that the most frequent occurrence of periodontitis was no periodontitis occurrence with a total of 69 respondents (93.2%) and there was a periodontitis occurrence with a total of 5 respondents (6.8%).

Bivariate Analysis

Based on research that has been conducted on diabetes mellitus sufferers in The working area of the Paguat Health Center UPTD, then the next step is to carry out Bivariate analysis to determine the relationship between dental and oral health maintenance and the incidence of periodontitis in patients with diabetes mellitus is shown in the following table.

Table 1.9 The Relationship between Dental and Oral Health Maintenance and Periodontitis incident on Diabetes Sufferers in the Paguat Health Center Working Area

No	Dental and oral health maintenance	F	%
1	Good	68	91.9



2	Currently	6	8.1
Total		74	100

Dental and oral health maintenance	Periodontitis Occurrence				Total	Statistical Test
	There is		There isn't any			
	F	%	F	%		
Good	0	0	68	91.9	68	0.000
Currently	5	6.8	1	1.3	6	
Total	5	6.8	69	93.2	74	

Source: Primary Data, 2024

Based on table 4.9, it shows that out of 74 respondents, 68 respondents (91.9%) of Diabetes Mellitus patients had good dental and oral health maintenance with no periodontitis, and good dental and oral health maintenance with periodontitis was 0 respondents (0%). Dental and oral health maintenance was moderate with no periodontitis was 1 respondent (1.3%) and 5 respondents (6.8%) had periodontitis.

In addition, the statistical test results obtained were the results of the *Fisher exact test* (because there were 2 cells). with *expect count* <5) 0.000 (<0.05). then it can be concluded that H_0 is rejected and H_1 is accepted which means there is a relationship between Dental and Mouth Health Maintenance and the Incidence of Periodontitis in Diabetes Mellitus Patients in the Working Area of UPTD Puskesmas Paguat.

Discussion

1. Dental and Oral Health Maintenance for Diabetes Patients in the Working Area of the Paguat Health Center UPTD

Based on the results of research conducted in the working area of the Paguat Health Center regarding dental and oral health maintenance, it shows that out of 74 respondents, the majority of dental and oral health maintenance was good with a total of 68 respondents (91.9%) and respondents whose dental and oral health maintenance was moderate with a total of 6 respondents (8.1%).

The results of the research data show that most respondents get good dental and oral health care, namely 68 respondents (91.9%), this is proven by the results of the study obtained by most respondents who said they always brush their teeth 2x a day using toothpaste, brush their teeth in the morning and at night before going to bed, use their own toothbrush and often visit the dentist every 6 months. According to Sari (2017), brushing teeth is an important action



taken by children to adults to maintain dental and oral health in good condition. The purpose of brushing teeth itself is to clean food residue, debris, or stain. Brushing teeth must also be done with the correct method and technique, because if done with the wrong technique it will cause damage to the tooth structure. In line with research conducted by Ainun (2016), awareness of maintaining and maintaining dental health is very necessary to prevent tooth decay. Researchers assume that good dental and oral health maintenance actions are by cleaning teeth using a toothbrush and toothpaste, flossing, and visiting the dentist every 6 months.

2. Periodontitis Incidence in Diabetes Mellitus Patients in the Working Area of UPTD Paguat Health Center

Based on the results of research conducted in the work area of the Paguat Health Center regarding Periodontitis Incidents, it is known that out of 74 respondents, the most Periodontitis Incidents were no Periodontitis Incidents with a total of 69 respondents (93.2%) and there were periodontitis incidents with a total of 5 respondents (6.8%). The results of these data prove that most respondents are in the category of no periodontitis.

The results of the research data showed that 69 respondents were in the category of no periodontitis incidents, as evidenced by the respondents' no loose teeth and no plaque and tartar on their teeth. According to Wijaksana (2020) Periodontitis is a multifactorial chronic inflammatory disease associated with an imbalance of plaque biofilm characterized by progressive damage to the supporting tissue of the teeth. Some of the symptoms experienced are plaque and tartar buildup on the teeth, the distance between one tooth and another feels loose, gums shrink, teeth are loose and fall out. exposed to certain infectious diseases. This is in line with Rizkiyah's research (2021) Periodontitis, which is a periodontal disease other than gingivitis, has actually been shown to be associated with high blood glucose levels. A high prevalence of periodontitis is found in patients with poor diabetes control.

3. The Relationship Between Dental and Oral Health Maintenance and the Incidence of Periodontitis in Diabetes Mellitus Patients in the Working Area of the Paguat Health Center UPTD

Based on the results of the *Fisher exact test* (because there were 2 cells with an expected count <5) 0.000 (<0.05), which shows that there is a relationship between maintaining dental and oral health and periodontitis events on diabetes sufferer mellitus. Therefore, the null hypothesis (H0) is rejected, and the alternative hypothesis (H1) is accepted, which means that there is a positive relationship between maintaining dental and oral health with periodontitis events on diabetes sufferer mellitus.

Some preventive measures to consider include Brushing your teeth twice a day with a fluoride toothpaste can help remove plaque and prevent tartar buildup, which can lead to periodontal problems. Daily flossing helps remove food debris and plaque from between the teeth and below the gum line, areas that a toothbrush cannot reach. Regular dental check-ups by a dentist are essential to detect periodontal problems early and take necessary preventive or



treatment measures. These measures not only help prevent diabetes-related complications but can also reduce morbidity due to oral manifestations such as gum infections and tooth decay (Rizkiyah et al., 2021).

Dental and oral health maintenance is in the good category with 0 respondents (0%) experiencing periodontitis and 68 respondents (91.9%) experiencing no periodontitis. This condition indicates that respondents who pay attention to their dental and oral health well usually do not experience periodontitis. Based on the research results obtained, respondents Every day diligently brushing teeth 2x a day, brushing teeth after eating and before going to bed, often consuming vegetables and fruits, respondents said that after eating they usually clean food residue on their teeth using a toothpick, and some routinely visit the dentist every 6 months. According to the theory of Watt et al (2019) A number of diverse factors influence individual behavior in maintaining dental and oral health, including the level of knowledge about dental and oral health and daily care is very important. Understanding the importance of dental and oral health, proper care guidelines, and the symbolic relationship between dental and oral health and general health is very important in determining and directing this oral health behavior.

This is in line with the research of Pramestrya Rizky (2015) with the results of the study showing that there is a significant relationship between the level of knowledge of oral health and the health status of periodontal tissue in diabetic patients with a negative correlation direction which means that the higher the level of knowledge, the better the health status of the periodontal tissue. Researchers assume that patients with good dental and oral health maintenance can be influenced by several factors, namely behavior, habits and knowledge. According to behavioral researchers, habits and education levels can affect a person's knowledge, where the higher a person's education level, the more knowledge they will obtain.

Meanwhile, respondents who had moderate dental and oral health maintenance with periodontitis incidents were 5 respondents (6.8%) and there was no periodontitis incident as many as 1 respondent (1.3%). From the results of the study, it was obtained that respondents who had moderate dental and oral health maintenance with periodontitis incidents were patients who still maintained their dental and oral hygiene by brushing their teeth 2x a day but not every day, and did not routinely visit the dentist. According to Nazir (2017) gingivitis is inflammation of the gums due to the accumulation of plaque and bacteria on the gums and teeth. Plaque is a thin layer that sticks to the teeth and causes irritation to the gums. Plaque consists of a combination of bacteria, food particles, and saliva. If gingivitis is not treated, in some cases, this condition can develop into a more serious disease called periodontitis, which can further damage the gums and bones supporting the teeth.

This is in line with Rina Andrian's research (2023) which shows that there is a relationship between dental and oral health maintenance measures and periodontitis in people with diabetes mellitus. Of the 70 respondents with Diabetes mellitus who had dental and oral health maintenance measures in the good category with no periodontitis disease, there were 17 people



(65.4%). Meanwhile, respondents with diabetes mellitus who had poor dental and oral health maintenance measures with periodontitis disease numbered 33 people (75%).

From the results of the study, it was obtained that respondents who had moderate dental and oral health maintenance with no periodontitis incidents maintained their dental and oral health by performing routine dental care but only occasionally, reducing sweet foods and increasing drinking water. The researcher assumes that dental and oral health maintenance measures in patients with diabetes mellitus are not good because periodontitis occurs because patients with diabetes mellitus have poor behavior towards dental and oral care, they do not understand and do not understand the importance of maintaining dental and oral health properly. They also do not realize that dental health can also affect the health of the rest of the body.

4. CONCLUSION

1. The maintenance of dental and oral health of the respondents was mostly in the good category with a total of 68 respondents (91.9%), the moderate category with a total of 6 respondents (8.1%) .
2. The majority of respondents' periodontitis incidents were in the no periodontitis category with a total of 69 respondents (93.2%), and the periodontitis category with a total of 5 respondents (6.8%).
3. There is a significant relationship between dental and oral health maintenance and the incidence of periodontitis in diabetes mellitus patients in the working area of the Paguat Health Center UPTD with a *p-value* of 0.000 which is significant ($p < 0.05$).

SUGGESTION

1. For Health Centers

Results study This recommended Can become material input in the implementation of dental and oral health programs in the field in raising degrees health tooth And mouth specifically on patient sufferer diabetes.

2. For the Community

It is recommended that it can be used as information about efforts that can be made to maintain health. tooth And mouth And prevent periodontitis disease.

3. For Further Researchers

This research is suggested to gain knowledge new about maintaining dental and oral health with the occurrence of periodontitis in diabetes sufferers And understand about study furthermore Which associated with diabetes complications.

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