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Periodontal Care Needs In Diabetic Patients: A Study Of The Prolanis Group In Banjarbaru City

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Abstract: South Kalimantan has seen a significant rise in dental and oral health issues, particularly periodontal diseases, which are prevalent among diabetic patients. This research aimed to analyze the periodontal status and the corresponding treatment needs of the Prolanis group, consisting of diabetic mellitus (DM) patients, at Sungai Ulin Health Center and South Banjarbaru Health Center, Banjarbaru City, during the second year of the study. A descriptive-analytical approach was employed to assess the periodontal tissue condition using the Community Periodontal Index of Treatment Needs (CPITN). A total of 65 respondents were examined, and the results indicated that 49.23% of the participants had tartar, while 30.78% displayed healthy periodontal conditions. Counseling on oral hygiene and scaling treatments were provided. The study emphasizes the importance of regular dental check-ups and proper oral hygiene practices, particularly in diabetic patients, to prevent further complications. Recommendations include brushing teeth twice daily and reducing the intake of cariogenic foods.

Keywords: Diabetes Mellitus; Oral Health; Periodontal Disease; Prolanis; Scaling

Introduction

Dental and oral health problems, particularly periodontal diseases, have emerged as a critical global public health issue due to their high prevalence and significant impact on individuals and healthcare systems. In Indonesia, the 2018 Basic Health Survey (Riskesdas) reported that 57.6% of the population suffers from dental and oral health problems, with 45.3% experiencing tooth decay or cavities (Kementerian Kesehatan RI, 2018). These conditions contribute to a substantial decrease in quality of life, affecting essential daily activities such as eating, speaking, and social interactions. Furthermore, untreated dental and periodontal diseases can lead to severe complications, including infections and systemic health issues, thereby increasing the burden on healthcare infrastructure and resources(Kocher et al., 2018; Noorhasanah et al., 2020).

Among these conditions, periodontal diseases are particularly concerning due to their strong association with diabetes mellitus (DM), a chronic metabolic disorder characterized by persistent hyperglycemia. Diabetes adversely affects periodontal health by promoting inflammation, impairing immune responses, and reducing the ability of tissues to heal, which leads to the destruction of supporting structures around teeth (Bakhshandeh et al., 2007; Linares-Vieyra et al., 2009). Conversely, periodontal disease exacerbates systemic inflammation, making blood sugar levels more difficult to control, thereby worsening the prognosis for diabetic patients. This bidirectional relationship highlights the need for integrated approaches to managing both conditions, emphasizing preventive care, patient education, and collaboration between dental and medical professionals.(Bakhshandeh et al., 2007; Linares-Vieyra et al., 2009; Reddy & Gopalkrishna, 2022).

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Periodontal disease arises from inflammation in the supporting structures of the teeth, primarily caused by the accumulation of dental plaque. This inflammation triggers a cascade of destructive processes, including the breakdown of connective tissue and the loss of alveolar bone, which ultimately results in tooth mobility and loss(Lakschevitz et al., 2011; Preshaw et al., 2012). The condition is influenced by multiple factors, with diabetes mellitus being one of the most significant. Research has shown that individuals with diabetes have up to four times the risk of developing periodontitis compared to non-diabetic individuals. The heightened risk is attributed to the systemic effects of chronic hyperglycemia, which alters immune responses and creates a pro-inflammatory environment conducive to periodontal destruction (Lakschevitz et al., 2011; Preshaw et al., 2012).

Hyperglycemia in diabetic patients intensifies the inflammatory response by increasing levels of cytokines and other pro-inflammatory mediators. This prolonged inflammatory state not only accelerates the damage to periodontal tissues but also impairs healing, making the condition more severe and harder to manage (Kocher et al., 2018; Lakschevitz et al., 2011; Sima & Glogauer, 2013). Prevention strategies for periodontal disease in diabetic patients emphasize effective plaque control, achieved through regular mechanical cleaning, such as brushing and flossing, the use of antimicrobial agents, and comprehensive oral health education (Bačić et al., 1988; Bakhshandeh et al., 2007; Das et al., 2011a; Linares-Vieyra et al., 2009). Additionally, maintaining optimal glycemic control is critical, as it reduces the systemic inflammatory burden and mitigates periodontal complications. These findings underscore the importance of an integrated care approach, combining dental and medical interventions to manage both diabetes and periodontal health effectively (Mavi et al., 2021; Niskanen et al., 2020; Sima & Glogauer, 2013).

Despite the extensive research highlighting the relationship between diabetes mellitus and periodontal disease, localized studies remain limited, particularly in regions such as Banjarbaru, South Kalimantan. This area faces a growing prevalence of diabetes mellitus, yet specific data on the periodontal health of diabetic patients within the Prolanis group—a community-based chronic disease management program—are scarce. The absence of such data creates a challenge for healthcare providers in tailoring effective intervention strategies to address the unique needs of this population (Hammad, 2023b, 2023a). Understanding the periodontal conditions and treatment requirements of the Prolanis group is essential for developing informed and context-specific health initiatives (Bakhshandeh et al., 2007; Das et al., 2011b; Linares-Vieyra et al., 2009).

The lack of localized insights emphasizes the importance of conducting research to bridge this gap. Evaluating the periodontal status of diabetic patients in Banjarbaru can help identify the extent of the problem and its contributing factors, such as oral hygiene practices, access to dental care, and glycemic control. Furthermore, assessing their treatment needs will provide a basis for targeted interventions, including preventive strategies, patient education, and resource allocation. By addressing these gaps, this study aims to support the development of a more effective and integrated approach to managing periodontal health in diabetic patients, ultimately improving their overall health outcomes.

One of the prevention efforts to reduce the number of periodontal diseases is plaque control. Preventive efforts to remove plaque regularly are through dietary regulation, mechanical plaque control, chemical plaque control and the use of physiotherapy tools and materials (Nurjanah et al., 2020). This research is crucial for providing a more comprehensive understanding of the relationship between diabetes mellitus and periodontal health at the community level. The findings are expected to inform the development of effective preventive and intervention measures, such as enhanced oral health education, improved access to scaling services, and tailored care guidelines for diabetic patients. The primary objective of this study is to assess the periodontal condition of the Prolanis group in Banjarbaru and provide evidence-based recommendations to improve their oral health outcomes.

Method

This study employs a descriptive analytical approach to evaluate the condition of periodontal tissues and assess the treatment needs for periodontal disease within the Prolanis group—diabetic patients receiving chronic disease management services. The research is conducted at two community health centers, PKM Sungai Ulin and PKM Banjarbaru Selatan, located in Banjarbaru City, South Kalimantan. To ensure thorough data collection and analysis, the study utilizes various diagnostic tools and materials, including disposable diagnostic sets, periodontal probes, scaling instruments, gloves, masks, disclosing agents, toothbrushes, cotton, alcohol, soap, tissues, water glasses, brochures, and examination sheets.

The research process involves several key steps. First, a comprehensive examination of the respondents' periodontal tissues is conducted to determine the current state of their oral health. This is followed by the assessment of dental plaque using the Community Periodontal Index of Treatment Needs (CPITN), a

standardized method for evaluating periodontal conditions. Subsequently, tartar removal (scaling) is performed by trained dentists at the health centers, while counseling sessions on oral hygiene practices are provided by dental nurses. After three months, a follow-up evaluation is conducted to assess the reformation of plaque and the effectiveness of the interventions.

Data collection is divided into two categories: primary and secondary data. Primary data includes the results of clinical examinations and scaling procedures conducted directly on the respondents. Secondary data is sourced from the health centers and includes demographic information about the Prolanis group members, such as their names, ages, genders, and occupations. All collected data is systematically recorded, compiled, and analyzed using the SPSS statistical software. The analysis includes the creation of frequency distributions and other statistical measures to provide a detailed overview of periodontal conditions and treatment needs within the studied population. This structured methodology aims to ensure clarity and reliability in identifying the periodontal health challenges faced by diabetic patients in the Prolanis group.

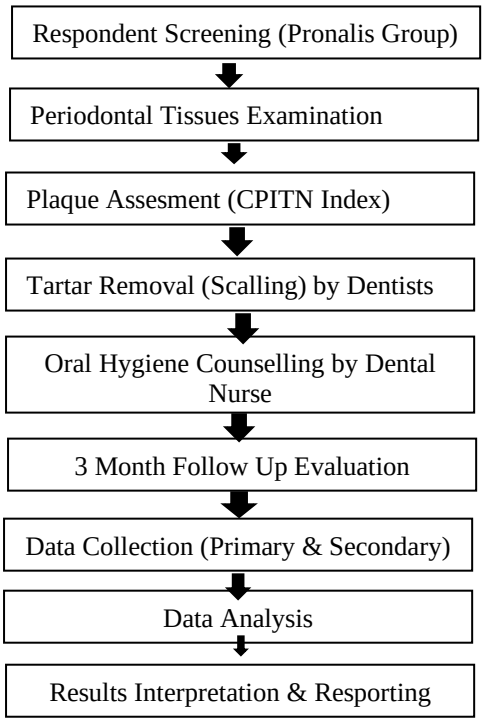

Figure 1. Research Process Flow Diagram

Result and Discussion

This research was conducted on a group of prolanis in the working area of the Sungai Ulin Health Center and the South Banjarbaru Health Center, Banjarbaru City, South Kalimantan Province. The prolanis group at the Sungai Ulin health center was 27 people and the prolanis group at the South Banjarbaru health center amounted to 38 people who were present when the research was carried out.

The number of respondents obtained was 65 people in the study where the respondents had a history of diabetes mellitus, with an age range between 26 years – 80 years. This research is conducted by conducting an examination.

The following table presents the distribution of periodontal status among the respondents based on the Community Periodontal Index of Treatment Needs (CPITN) scores. This data reflects the varying levels of periodontal conditions, ranging from healthy to more severe cases, observed in the Prolanis group, which includes diabetic mellitus patients at the Sungai Ulin and South Banjarbaru Health Centers:

Table 1. Distribution Based on Periodontal Status

CPITN score	N	Percentage (%)
0	20	30.78
1	4	6.15
2	32	49.23
3	9	13.84
4	0	0
Total	65	100

It appears in the Table 1, and Figure 1 Periodontal Status Based on CPITN Measurement, shows a score of 0 for 20 people (30.78%), score 1 for 4 people (6.15%), score 2 for 32 people (49.23%), score 3 for 9 people (13.84%) and score 4 for 0 people (0%) with a total of 65 people (100%).

Table.2 Based on Age Group and Periodontal Disease Status Score South of Banjarbaru City, South Kalimantan Province

Age Group	Highest score of periodontal disease				Total
	0	**1**	**2**	**3**	
26 – 35	1 (1.6 %)	0	1 (1.6%)	0	2 (3.1%)
36 – 45	3 (4.7%)	0	0	0	3(4.62%)
46 – 55	6 (9.3%)	4 (6.2%)	10 (15.4%)	0	20 (30.8%)
56 – 65	3 (4.7%)	0	17 (26.2%)	5 (7.69%)	25(38.0%)
66 – 75	6 (9.3%)	0	4 (6.2%)	4 (6.15%)	14 (21.6%)
76 – 85	1 (1.6%)	0	0	0	1(1.6%)
Total	20 (30.7%)	4 (6,2)	32 (49.3%)	9 (13.9%)	65 (100%)

Based on the Table 2 The age group of 30-40 years as many as 7 people have the highest score of periodontal disease with a score of 0 as many as 2 people and a score of 2 as many as 5 people, the age group of 41-50 years as many as 5 people have the highest score of periodontal disease with a score of 0 as many as 2 people, a score of 2 as many as 2 people, and a score of 3 as many as 1 person, the age group of 51-60 years as many as 30 people have the highest score of periodontal

disease with a score of 0 as many as 2 people, Score 2 as many as 22 people and score 3 as many as 6 people, the age group of 61-70 years as many as 22 people have the highest score of periodontal disease with a score of 0 as many as 3 people, score 2 as many as 12 people and score 3 as many as 7 people, and the age group of 71-80 years as many as 4 people have the highest score of periodontal disease with a score of 0 as many as 2 people, Score 2 as many as 1 person and score 3 as many as 1 person with a total number of respondents of 68 people.

Table.3 Distribution Based on Periodontal Status Relationships, Categories of Care Needs, Personnel and Types of Services

CPITN Score	PTC*	∑	(%)	MN*	HW*
0	Healthy	20	30.78%	HE	kader
1	Bleeding	4	6.15%	HE	drg/prg
2	Tartar	32	49.23%	DHE + Scaling	drg/prg
3	Shallow Pocket	9	13.84%	DHE+ Scaling	drg/prg
4	Pocket	0	0%	Root Planning	drg
Total	-	65	100%	-	-

*PTC = Periodontal Tissue Conditions
*MN = Maintenance Needs
*HW = Health Workers

Appears in the table 3 that the relationship of periodontal status in the category of treatment needs, type of services and manpower, shows a score of 0 = healthy tissue condition as many as 20 people (30.78%), the need for treatment with DHE who provides is dental and oral health cadres, score 1 = bleeding as many as 4 people (6.15%), score 2 = there is tartar as many as 32 people (49.23%), the need for DHE and scaling treatment, score 3 = shallow pocket as many as 9 people 13.84%) the need for treatment is DHE, Scaling and root planning, while the score of 4 = pocket in 0 people (0%) with a total of 65 people (100%).

The results of the examination obtained in the Prolanis group, there are 2 people who are easily old enough to suffer from diabetes mellitus (Oates & Khandelwal, 2020a; Wu et al., 2020; Zhang et al., 2021). Based on the results of the researcher's interviews with respondents, information was obtained that they like to consume drinks and sugary foods. This is in line with research conducted by Asriati (2023) who said that teenagers today have a tendency to follow the trend of consuming fast food such as sweet foods and drinks. Nowadays, adolescents tend to follow the trend of consuming sugary foods and drinks, which leads to dietary changes with lower nutritional intake (Reddy & Gopalkrishna, 2022; Sedghi et al., 2021). Where the more often you consume sweet foods and fast food, the greater the risk of diabetes mellitus (Asriati, 2023).

Consumption of sugary foods and drinks can facilitate the formation of plaque on the surface of the teeth, which is one of the factors that cause dental diseases such as caries and periodontal disease. This is in line with research conducted by Arsad, Yasin, A,S, Ibrahim (2022) (Arsad et al., 2022), who said that sugary foods and drinks can harm dental health (Bissett et al., 2015; Kocher et al., 2018; Lakschevitz et al., 2011; Preshaw et al., 2012; Wolff, 2014). Frequent consumption of cariogenic foods can cause the pH in the mouth to be low, leading to increased demineralization and decreased tooth remineralization. And the negative impact of frequent consumption of sweet or cariogenic foods affects dental health. This happens because cariogenic foods tend to stick to the surface of the teeth (Arsad et al., 2022).

Based on the table.3.the prevalence of periodontal tissue damage increases with increasing age. A soft diet consumed by the elderly, reduced oral activity and an increased incidence of serostomia also play a role in the formation of dental plaque (Bui et al., 2019; Stöhr et al., 2021). Dental plaque is believed to be the main cause of periodontal tissue damage. Prakosa, P, A, Aliyyu, C,W, Nada Janardita Rosyadah, J,N, et al., (2023) (Prakosa et al., n.d.), who said that high blood sugar levels in people with diabetes mellitus can affect the function of other organs, which has the potential to cause various disorders, including disorders in the oral cavity (Aliyah et al., 2022; Llambés, 2015; Persson, 2011). Treatment of oral manifestations due to diabetes mellitus cannot only focus on problems in the oral cavity, but also require treatment of the main cause, namely diabetes mellitus itself (Hammad, 2023a, 2023b).

Table.4. The highest score of periodontal disease is the presence of tartar, this is caused by the presence of food residues that are not cleaned on the surface of the teeth so that it becomes dental plaque which then accumulates with microorganisms (Enteghad et al., 2024; Loos & Van Dyke, 2020). Dental plaque is a factor that causes periodontal disease, this is in accordance with and to prevent periodontal disease, it can be done in at least two ways, namely controlling plaque by removing microorganisms regularly and mechanically, namely by brushing teeth properly and cleaning tartar periodically (Aizenbud et al., 2023; Isola et al., 2023; Nibali et al., 2022). Another study conducted by Rafika, Hadijah, S, Murtaji, M.R, et al., (2022), said that "Habits to maintain a diet, clean teeth and mouth, reduce the consumption of sweet foods can reduce the risk of bad in the mouth of people with diabetes mellitus (Rafika et al., 2022).

In line with that, according to research conducted by Puspasari, S, Nurdina, G, Dwilestari, W, (2023)

(Puspasari et al., 2023), research conducted by Cicmil et al (2020) (Cicmil et al., 2020) showed oral or periodontal and dental health in all patients (Das et al., 2011b; Mavi et al., 2021; Negrato et al., 2013; Niskanen et al., 2020). Diabetic patients have poor periodontal health, so their oral health is also poor. Based on the results of the research conducted by there are differences in the condition of periodontal tissue in people with diabetes mellitus and non-diabetic mellitus. People with diabetes mellitus have a risk of experiencing periodontitis 4 times compared to non-diabetic people (Rahayu and Sopianah, 2022).

While in Table 5 The need for care is the status of tartar for 32 people (49.23%) where all age groups from 26-35 years to 76-85 years suffer from tartar so that the care needs provided include counseling (DHE) and tartar cleaning (dental scaling) to the respondents (Cahyani & Putri, 2021; Khan et al., 2015; Leman, 2016; Muchlis & Rizqiani Rusydi, 2022; Rizkiyah et al., 2021; Wibowo & Utami, 2022). Many people who suffer from tartar will have an impact on the energy needed, this is in accordance with research conducted by that the initial treatment of periodontal tissue disease begins with scaling and root planning to eliminate plaque and calculus, then followed by giving instructions on how to maintain oral hygiene (Liccardo et al., 2019; Nocini et al., 2020; Oates & Khandelwal, 2020b; Păunică et al., 2023; Rajkumar et al, 2012). And the treatment given to 32 people is in the form of tartar cleaning (scaling) while the score of 3 requires more complex treatment because the larger the treatment need score, the more manpower will also be needed in accordance with the type of service provided.

Conclusion

This study evaluated the periodontal condition and treatment needs of diabetic patients (Prolanis group) at the Sungai Ulin Health Center and South Banjarbaru Health Center. The findings revealed that the majority of Prolanis group members suffer from tartar buildup. Additionally, most patients underwent dental scaling as part of their treatment. These results highlight the importance of consistent oral hygiene and professional dental care, especially for diabetic patients, to prevent the progression of periodontal diseases.

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Author Contributions
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Conflicts of Interest
The authors declare no conflict of interest

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