



**THE RELATIONSHIP BETWEEN PERIODONTAL STATUS AND QUALITY OF LIFE
IN TYPE 2 DIABETES PATIENTS IN SOUTH BARITO**

Pingkan Tulus Putri Martjun^{1*}, Rr. Asyurati Asia², Yohana Yusra³

¹Master of Dental Science Study Program Faculty of Dentistry, Universitas Trisakti, Jl. Letjen S. Parman No.1, Grogol, Grogol petamburan, Jakarta Barat, Jakarta 11440, Indonesia

²Public Health and Preventive Dentistry Department, Faculty of Dentistry, Universitas Trisakti, Jl. Letjen S. Parman No.1, Grogol, Grogol petamburan, Jakarta Barat, Jakarta 11440, Indonesia

³Department of Orthodontics, Faculty of Dentistry, Universitas Trisakti, Jl. Letjen S. Parman No.1, Grogol, Grogol petamburan, Jakarta Barat, Jakarta 11440, Indonesia

*pingkanmartjun@gmail.com

ABSTRACT

The global burden of type 2 diabetes mellitus continues to rise, and Indonesia is no exception. One of the major challenges faced by these patients is poor oral health, particularly periodontal disease, which can diminish overall well-being. This study aimed to examine how periodontal health relates to the quality of life of individuals with T2DM in South Barito. A cross-sectional design was employed, involving diabetic patients who sought care at local health facilities. Periodontal condition was measured using the Community Periodontal Index of Treatment Needs, whereas oral health-related quality of life was assessed through the Oral Health Impact Profile-14. Data analysis was conducted with a significance threshold of $p < 0.05$. The findings revealed that patients with more severe periodontal issues (higher CPITN scores) experienced significantly poorer quality of life, particularly in domains such as daily functioning, pain, psychological well-being, and social interaction. A significant inverse correlation was identified between periodontal status and quality of life ($p < 0.05$). These results highlight the importance of periodontal care as an integral component of diabetes management to help improve patients' quality of life.

Keywords: CPITN; OHIP- 14; periodontal status; quality of life; south barito; type 2 diabetes mellitus

How to cite (in APA style)

Martjun, P. T. P., Asia, R. A., & Yusra, Y. (2025). The Relationship Between Periodontal Status and Quality of Life in Type 2 Diabetes Patients in South Bariton. *Indonesian Journal of Global Health Research*, 7(6), 875–884. <https://doi.org/10.37287/ijghr.v7i6.454>.

INTRODUCTION

Diabetes mellitus is a long-term metabolic disorder characterized either by insufficient insulin production in the pancreas or by the body's inability to utilize insulin effectively. Inadequate regulation of this process often results in hyperglycemia, which, if poorly controlled, can progressively damage various organ systems, particularly the vascular and nervous systems. Given its chronic nature, diabetes requires continuous management, as the disease and its complications can substantially impair an individual's quality of life (Trikkalinou et al., 2017). WHO is estimated that by 2025, there will be an increase of up to 300 million people suffering from Diabetes Mellitus (World Health Organization, n.d.). According to the IDF, approximately 463 million individuals worldwide are currently living with diabetes mellitus, representing about 9.3% of adults between the ages of 20 and 79. The IDF further projects a steady rise in cases, estimating that the global diabetic population could reach 16.6 million by the year 2045 (WHO, 2025).

The WHO states that as many as 422 million people suffer from diabetes mellitus and as many as 1.6 million deaths each year due to diabetes mellitus (World Health Organization, n.d.). Muliani stated that Indonesia ranks fourth in the world in terms of the number of Diabetes Mellitus sufferers, after the US, China, and India. In addition, the number of diabetes sufferers in Indonesia is expected to increase significantly, reaching 2-3 times in 2030 compared to 2000 (Leonita & Muliani, 2015). Based on IDF data, in Indonesia is 6.7% of (10,276,100 cases of Diabetes Mellitus 166,531,000 adults) (IDF, 2019).

The 2018 Basic Health Research found that doctors diagnosed 1.5% of the Indonesian population, or 1,017,290 people of all ages, with diabetes mellitus. Findings from the 2018 Basic Health Research (Riskesdas) indicate a rising prevalence of diabetes mellitus in Indonesia, increasing from 5.7% in 2007 to 8.9% in 2017. Within this national context, Central Kalimantan ranks seventh among provinces, reporting a prevalence rate of 2.1%. The provinces with the highest rates of diabetes mellitus are the Special Capital Region (DKI) of Jakarta (3.1%), the Special Region of Yogyakarta (DIY) (2.9%), North Sulawesi (2.8%), East Kalimantan (2.7%), Bali (2.5%), and North Sumatra (2.4%) (Kementerian Kesehatan Republik Indonesia, 2018).

Dental and oral complications include periodontal disease, oral candidiasis, loose teeth, ulcers on the oral mucosa, taste disorders, xerostomia and salivary gland hypofunction, dental caries, and a burning sensation in the mouth (Bajaj et al., 2012). These oral health problems can affect various aspects such as appearance, oral function, and interpersonal relationships, in quality of life and worsen overall health conditions (Irani et al., 2015; Safkan-Seppälä, 2001). Periodontal disease in particular tends to occur more frequently in Diabetes Mellitus due to the inflammatory process that is exacerbated by the accumulation of AGEs/Advanced glycation end products in tissues and plasma (Ryan et al., 2003). Periodontal infections can also affect the metabolic control of Diabetes Mellitus, adding to the complexity of managing the overall health condition (Abu-Ta'a, 2014)

Gorton's research confirmed that prevention and treatment of periodontal disease have a positive impact on controlling diabetes mellitus. A common complaint among people with diabetes mellitus is xerostomia, which can lead to dental and oral problems, including tooth decay, especially at the tooth roots, which are susceptible to caries (Garton & Ford, 2012). In general, approximately 85% of T2DM. In type 2 diabetes, insulin-producing cells are not damaged, but they do not function properly.

Periodontal disease is a widespread oral health problem across many countries and is recognized as one of the complications associated with diabetes mellitus. To better assess its prevalence and severity, the WHO has emphasized the importance of systematic evaluation, leading to the development of the CPITN. This index serves as a standardized tool to describe the condition of periodontal tissues, determine disease severity, and identify the type and extent of treatment required (Putri et al., 2010). Research conducted by Hindriyana, involving 45 individuals with type 2 diabetes mellitus and 45 non-diabetic participants, demonstrated that patients with type 2 diabetes had higher average periodontal disease severity scores as measured by the CPITN index (Wulandari, 2010). Periodontitis plays a contributory role in the progression of type 2 diabetes mellitus, with diabetic patients being more vulnerable to severe forms of the disease compared to non-diabetic individuals. Its consequences can be considerable, leading to pain, compromised oral function, and a notable decline in overall quality of life (Abdellatif et al., 2021).

The majority of diabetes cases are attributed to type 2 diabetes mellitus, which represents more than 90% of the total global burden. Shifts in behavior and lifestyle patterns such as physical inactivity, high sugar intake, and obesity have been identified as key contributors to the rising incidence of type 2 diabetes worldwide. These risk factors are closely linked to metabolic syndrome and diabetes mellitus (Kementerian Kesehatan Republik Indonesia, 2025). While genetic predisposition, particularly within certain ethnic groups, also plays a role, the Indonesian government has taken preventive and management measures. One such initiative is the Minister of Health Regulation No. 603 of 2020, which provides the National Guidelines for Medical Services in the Management of Type 2 Diabetes in Adults (Kementerian Kesehatan Republik Indonesia, 2014).

Type 2 diabetes mellitus is largely caused by environmental and behavioral factors. Once known as a disease that only affected adults, many children and adolescents now also suffer from this condition. Increasing obesity and lack of physical activity are believed to play a significant role in the increase in cases of type 2 diabetes mellitus in children. In Indonesia, the incidence of diabetes

mellitus among children has also shown a sharp increase. Data from the IDAI revealed that by January 2023, the prevalence of pediatric diabetes had risen nearly seventy times compared to figures reported in 2010 (Kementerian Kesehatan Republik Indonesia, 2018).

In Indonesia, dental and oral health issues, particularly in Central Kalimantan, are a significant concern. Data on the prevalence of type 2 diabetes mellitus in Central Kalimantan reached 2.1% in 2018 and increased to 6.2% in 2020. Of the 14 regencies/cities in Central Kalimantan, South Barito Regency ranks fourth with a significant prevalence of diabetes mellitus diagnosed by doctors across all ages, at 1.89% (Tim Riskesdas, 2018). Data from the 2018 Basic Health Research (Riskesdas) showed that 9.19% of people in South Barito Regency experienced loose teeth. This means that 4 out of 10 people in Central Kalimantan, particularly in South Barito Regency, suffer from periodontitis. Furthermore, Riskesdas data also shows that 30.3% of people aged 15 and over suffer from diabetes mellitus (Tim Riskesdas, 2018).

Building on previous studies examining the relationship between oral health status and quality of life in patients with diabetes mellitus, the present research seeks to explore the association between periodontal status and oral health-related quality of life specifically among individuals with type 2 diabetes mellitus in South Barito Regency, Central Kalimantan. By incorporating demographic factors, this study aims to generate valuable insights that may contribute to early prevention strategies, the development of more effective treatment approaches, and the promotion of oral healthcare practices tailored to the needs of patients with chronic medical conditions such as diabetes.

METHOD

This study employed an analytical observational design with a cross-sectional approach. In this design, data on both independent and dependent variables were collected at a single point in time without any follow-up (Budiarto, 2004). The research was carried out at two sites: the Jaraga Sesameh Buntok Regional Hospital, located at Jl. Patianom No. 6, Hilir Sper, Dusun Selatan District, South Barito Regency, Central Kalimantan 73751, and the Buntok Community Health Center, situated at Jl. Pahlawan, Buntok City, Dusun Selatan District, South Barito Regency, Central Kalimantan 73713. Data collection took place within the Dental and Oral Health Clinic units of these facilities. The study, which focused on examining the association between periodontal status and quality of life among patients with type 2 diabetes mellitus in South Barito Regency, was conducted between April and June 2025, a period designated for administering questionnaires to respondents and analyzing the results.

The study population comprised patients diagnosed with type 2 diabetes mellitus, aged 20–79 years, who consented to participate. Data collection was carried out in the Dental and Oral Health Clinic of Jaraga Sesameh Buntok Regional Hospital and at the Buntok Community Health Center. Respondents were recruited to complete a questionnaire assessing the relationship between periodontal status and quality of life among individuals with type 2 diabetes mellitus in South Barito Regency, Central Kalimantan. Eligible participants were identified through medical records of patients attending the Internal Medicine Clinic, Geriatric Clinic, and Dental and Oral Health Clinic at Jaraga Sesameh Buntok Regional Hospital, as well as the NCD Clinic, Elderly Clinic, and Dental Clinic at the Buntok Community Health Center. These facilities were chosen due to their relatively high number of diabetes mellitus patients. Sampling was conducted using a purposive (non-random) technique, as participants were required to meet specific inclusion criteria determined by the researcher. The minimum sample size was calculated using the Lameshow formula, resulting in a required sample of 139 participants. Data processing and analysis were carried out using Microsoft Office Excel and IBM SPSS. SPSS was applied to organize and describe the demographic characteristics of the respondents, such as age, sex, educational background, and occupation. The study data were further examined through both univariate and bivariate statistical analyses.

RESULT

The first test performed was to examine the data distribution using the Kolmogorov-Smirnov test. Research data is considered normally distributed if it has a probability significance value (p-value) $> \alpha$ (0.05). The results of the Kolmogorov-Smirnov test are as follows:

Tabel 1.

Normality Test

	Kolmogorov-Smirnova			Shapiro-Wilk		
	Statistics	df	Sig.	Statistics	df	Sig.
Age	.529	139	.000	.298	139	.000
Gender	.361	139	.000	.634	139	.000
Level of education	.376	139	.000	.654	139	.000
Work	.260	139	.000	.855	139	.000
Long suffering	.353	139	.000	.720	139	.000
Quality of Life of Type 2 Diabetes Mellitus Patients	.298	139	.000	.758	139	.000
CPITN	.255	139	.000	.859	139	.000

a. Lilliefors Significance Correction

The Kolmogorov-Smirnov test results indicated a significance value ($p = 0.000$), which is smaller than the alpha threshold of 0.05, showing that the dataset does not follow a normal distribution. Therefore, the analysis proceeded using the Spearman Rank Rho test. This test determines whether a statistically meaningful relationship exists between variables by comparing the Sig. (2-tailed) value with the alpha level. A Sig. (2-tailed) result below 0.05 suggests a significant correlation, whereas a value above 0.05 indicates that the relationship is not statistically meaningful. The degree of association is further interpreted using the correlation coefficient: values between 0.00–0.25 reflect a very weak relationship, 0.26–0.50 indicate a moderate connection, 0.51–0.75 demonstrate a strong link, 0.76–0.99 represent a very strong relationship, and a value of 1.00 signals a perfect correlation. In addition, the sign of the coefficient explains the direction of the association, with a positive value showing that both variables move in the same direction, while a negative value signifies that they change in opposite direction.

Table 2.

Analysis of the Relationship between Gender and Quality of Life

Gender	Quality of Life						Total		P Value	Koofisien Correlation
	f	%	f	%	f	%	f	%		
Male	27	19,42	17	12,23	20	14,39	64	46,04	0,000	0,203
Female	13	9,35	32	23,02	30	21,58	75	53,96		

Table 2, the Spearman Rank analysis demonstrates a statistically significant association between gender and quality of life among patients with type 2 Diabetes Mellitus, as reflected by a p-value of 0.000 ($p < 0.05$). The obtained correlation coefficient of 0.203 suggests that the relationship is positive but falls within the very weak category. This finding implies that gender contributes to variations in patient quality of life, although the degree of its impact remains minimal.

Table 3.

Analysis of the Relationship between Age and Periodontal Status

Age (Year)	Code 1		Code 2		Code 3		Code 4		Total		P Value	Koofisien Correlation
	f	%	f	%	f	%	f	%	f	%		
20-44	3	2,16	41	29,50	48	34,53	24	17,27	116	83,45	0,000	0,308
45-59	0	0,00	0	0,00	7	5,04	12	8,63	19	13,67		
60-69	1	0,72	1	0,72	0	0,00	2	1,44	4	2,88		
70-79	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00		
≥ 80	0	0,00	0	0,00	0	0,00	0	0,00	0	0,00		

Table 3, the Spearman Rank test produced a p-value of 0.000, indicating a statistically significant association between age and periodontal status since the result is lower than the alpha threshold of 0.05. This suggests that age is related to periodontal health among patients with type 2 Diabetes Mellitus in South Barito. The correlation coefficient obtained was 0.308, which reflects a moderate positive relationship, meaning that as age increases, changes in periodontal status also occur in the same direction.

Table 4.

Results of the Analysis of the Relationship between Education and Quality of Life

Education	Quality of Life						Total		P Value	Koofisien Corelation
	Good		Medium		Bad					
	f	%	f	%	f	%	f	%		
Elementary	0	0,00	0	0	1	0,72	1	0,72	0,000	0,203
Secondary	11	7,91	20	14,39	27	19,42	58	41,73		
High	27	19,42	19	13,67	34	24,46	80	57,55		

Table 4, the Spearman Rank test conducted on 139 participants yielded a correlation coefficient of +0.115 with a p-value of 0.177, which exceeds the alpha level of 0.05. These findings suggest a very weak positive association between educational attainment and quality of life among individuals with type 2 Diabetes Mellitus; however, the relationship is not statistically significant. This implies that education level alone does not directly influence quality of life in this context. Other determinants such as socioeconomic conditions, presence of complications, duration of the illness, and availability of social support are likely to exert a stronger effect. Although education may contribute, its influence appears to be indirect rather than independent.

Table 5.

Relationship between Work and Quality of Life

Employment	Quality of Life						Total		P Value	Koofisien Correlation
	Good		Medium		Bad					
	f	%	f	%	f	%	f	%		
Non-Employee	0	0,00	0	0,00	0	0,00	0	0,72	0,000	0,379
Civil Servant	16	11,51	3	2,16	4	2,88	23	16,		
Private Employee	15	10,79	16	11,51	12	8,63	43	30,94		
Entrepreneur	4	2,88	16	11,51	14	10,07	34	24,46		
Other	5	3,60	14	10,07	20	14,39	39	28,06		

Table 5, the Spearman Rank analysis revealed a significant association between occupation and quality of life among patients with type 2 Diabetes Mellitus, as evidenced by a p-value of 0.000 ($p < 0.05$). The correlation coefficient of 0.379 reflects a moderately strong positive relationship, suggesting that patients with better occupational status tend to report higher levels of quality of life.

Table 6.

Results of the Analysis of the Relationship between Duration of Suffering and CPITN Value

Long-Term Suffering	Code 1		Code 2		Code 3		Code 4		Total		P Value	Koofisien Correlation
	f	%	f	%	f	%	f	%	f	%		
Short Duration (1 -<8 Month)	3	2,16	41	29,50	48	34,53	24	17,27	116	83,45		
Moderate Duration (9-16 Month)	0	0,00	0	0,00	7	5,04	12	8,63	19	13,67		
Long Duration (>16 Month)	1	0,72	1	0,72	0	0,00	2	1,44	4	2,88	0,000	0,308

Table 6, the Spearman Rank analysis demonstrated a significant association between the duration of diabetes and the CPITN scores in patients with type 2 Diabetes Mellitus, as shown by a p-value of 0.000 ($p < 0.05$). The correlation coefficient of 0.360 indicates a moderately strong positive relationship, suggesting that a longer history of diabetes is associated with higher CPITN values, which reflect a deterioration in periodontal health.

Table 7. Results of the Analysis of the Relationship between Periodontal Status and Quality of Life

Periodontal Status	Quality of Life						Total		P Value	Correlation Coefficient
	Good		Moderate		Poor					
	f	%	f	%	f	%	f	%		
Code 0: Healthy periodontium	0	0.00	0	0.00	0	0.00	0	0.00		
Code 1: Bleeding after probing	3	2.16	0	0.00	1	0.72	4	2.88		
Code 2: Presence of supragingival or subgingival calculus or plaque accumulation around gingiva, no pockets >3 mm (probe marking visible all around)	34	24.46	5	5.70	2	0.00	42	30.22	0.000	0.830
Code 3: Pocket depth ≥4 mm (if probe inserted, the probe marking is partly visible; presence of bleeding or calculus possible)	3	2.16	19	28.06	13	9.35	35	25.90		
Code 4: Pocket depth ≥6 mm (if probe inserted the probe disappears fully, pocket depth not visible; presence of furcation area or loss of attachment >7 mm)	0	0.00	25	13.44	14	25.90	38	27.34		

Table 7, the Spearman Rank test revealed a significant association between periodontal status and quality of life in patients with type 2 Diabetes Mellitus, with a p-value of 0.000, which is below the alpha threshold of 0.05. This confirms that periodontal status is significantly related to patient quality of life in South Barito. The correlation coefficient of 0.830 demonstrates a very strong positive relationship, indicating that poorer periodontal conditions are closely linked to lower quality of life among individuals with type 2 Diabetes Mellitus.

DISCUSSION

The results of the normality assessment showed that the data did not follow a normal distribution pattern, which led to the use of the Spearman Rank test as the analytical approach. This non-parametric method is considered suitable for examining associations between variables when the assumptions of normality are not met, and it has been widely applied in epidemiological investigations concerning type 2 diabetes mellitus and quality of life (Manderscheid, 2007). One advantage of the Spearman test lies in its straightforward interpretation: significance levels reflect the existence of a relationship, while the correlation coefficient provides insight into both the intensity and the direction of the association. In public health research, these interpretive guidelines have become an important reference point for evaluating statistical connections across various study contexts (Mukaka, 2012).

Recent findings highlight that uncontrolled blood sugar, oral health problems, and limited energy intake are strongly linked to reduced physical and psychological well-being among individuals with type 2 diabetes mellitus (Khader, 2024). Evidence from earlier research further supports this connection; for instance, a study in PLoS One reported that fatigue, persistent pain, and elevated body mass index were among the key factors contributing to lower quality of life in this patient group (Plank, 2016). More recent systematic reviews also underline the role of oral complications, with conditions such as dry mouth and periodontitis shown to markedly reduce OHIP-14 scores, reinforcing the interplay between oral health and overall life quality (Nizam, 2023). From a pathophysiological perspective, the relationship between diabetes and periodontal health has been traced to mechanisms including advanced glycation end-product buildup, impaired immune function, and sustained inflammation that progressively weakens periodontal structures concepts

well established in periodontology references (Smith, 2015). These chronic processes help explain why patients with long-standing diabetes experience greater declines in well-being. Translating these insights into practice, an integrated approach that combines glycemic management, periodontal therapy, and attention to persistent symptoms such as tiredness and pain is recommended. Coordinated care, patient education, and close follow-up by both medical and dental professionals are crucial strategies to preserve and enhance quality of life for individuals with prolonged (ADA), (2025).

Analysis using the Spearman Rank method revealed a meaningful link between gender and the quality of life of people living with type 2 diabetes mellitus in South Barito. While the relationship was weak, it still suggested that men tended to perceive their quality of life somewhat better than women. This pattern reflects broader evidence that women with this condition often encounter more obstacles in maintaining well-being. Such difficulties are shaped by a combination of psychosocial pressures, greater susceptibility to anxiety in social interactions, responsibilities tied to multiple roles, and limitations in health services that do not fully accommodate gender-related needs (Gebeyaw & Lema, 2025; Lundgren, 2023).

The findings in Table 3 indicate a clear association between increasing age and the decline of periodontal health, with older individuals showing greater susceptibility to periodontal problems. This trend is consistent with observational evidence highlighting that elderly patients with type 2 diabetes mellitus often experience higher rates of periodontitis, with age and male sex emerging as prominent risk factors (Völzke, 2022). From a biological standpoint, this deterioration can be explained by the buildup of advanced glycation end-products, heightened oxidative stress, and persistent systemic inflammation triggered by long-term hyperglycemia, all of which contribute to progressive damage of periodontal tissues (Smith, 2015).

The results in Table 4, based on the Spearman Rank correlation test of 139 participants, suggest a slight positive association between education level and quality of life among individuals with type 2 diabetes mellitus in South Barito Regency. However, the relationship was not statistically significant, meaning there is no strong evidence to confirm that educational attainment directly influences quality of life in this population (Park & Ki, 2020). This implies that other factors beyond formal education may play a more decisive role in shaping the well-being of patients living with diabetes. From an interpretive standpoint, the weak positive association indicates that individuals with higher educational attainment may experience slight improvements in their quality of life, yet the effect is too small and statistically insignificant to be considered a determining factor for patients with type 2 diabetes.

This outcome aligns with the understanding that quality of life in chronic conditions such as diabetes is shaped by a broad set of social and clinical dimensions. Prior studies highlight that factors like disease duration, glycemic control, the presence of complications, psychological distress, adherence to therapy, and the availability of family or community support often play a more substantial role (Zhang & Yang, 2023). While formal education contributes by enhancing health literacy and empowering patients to participate more actively in self-care (Gómez-Urquiza et al., 2023), its influence tends to be mediated by additional variables such as social networks and financial resources, which together create a more comprehensive framework for determining patient well-being (Piette & Hyman, 2014).

Environmental characteristics also contribute, such as access to healthcare facilities, economic conditions, and local culture. Highly educated patients living in areas with limited medical access or high economic burdens may still have a low quality of life, despite having a high education ratio. environmental conditions are another critical element in shaping the quality of life of people with type 2 diabetes. Even when patients have higher levels of education, living in regions with poor healthcare access, financial strain, or cultural practices that limit treatment-seeking behavior can

still result in a lower quality of life. This perspective reinforces earlier evidence that education alone cannot be considered a decisive factor in determining well-being. Studies have shown that emotional health, supportive relationships, and community engagement often outweigh the influence of formal education in how patients perceive and experience their daily lives (Marmot & Allen, 2022). For this reason, interventions aimed at improving patient outcomes should adopt an integrated and context-sensitive approach, combining education with strengthened social networks, empowerment strategies, and comprehensive medical care.

The results of the Spearman Rank analysis in table 5 reveal a meaningful association between employment status and the quality of life of individuals with type 2 diabetes mellitus. The relationship is moderately strong and in a positive direction, suggesting that patients with stable or formal jobs tend to report better well-being compared to those engaged in informal work or unemployed. Notably, civil servants represented the group with the highest proportion of favorable quality of life, which can be attributed to financial security, access to health services, and insurance coverage that permanent employment often provides (Al-Rubaye & Abdullah, 2023). Stable work conditions also help support structured daily routines and strengthen psychological resources such as self-control and self-esteem, both of which are essential for maintaining quality of life (Hempler et al., 2021). In contrast, precarious employment or lack of work is commonly linked with ongoing stress, economic vulnerability, and reduced adherence to treatment, factors that significantly compromise the health outcomes of people living with chronic diseases. (Walker et al., 2014).

The analysis in Table 6 demonstrates a clear and strong relationship between the duration of type 2 diabetes mellitus and periodontal health, with longer disease duration associated with progressively worse periodontal status. Patients who had lived with diabetes for extended periods were more likely to fall into higher CPITN categories, reflecting advanced inflammation and tissue destruction in the gums. This pattern can be explained biologically, as prolonged hyperglycemia accelerates the accumulation of advanced glycation end-products, enhances oxidative stress, and disrupts normal immune cell function, all of which contribute to persistent gingival inflammation (Lalla & Papapanou, 2011). Evidence from longitudinal research further supports this, showing that patients with many years of poorly controlled diabetes are at greater risk of attachment loss and deeper periodontal pockets, underscoring the importance of strict metabolic regulation in preventing severe oral complication (Tonetti et al., 2022).

The findings in Table 7 reveal a very strong positive association between periodontal health and quality of life among patients with type 2 diabetes mellitus. As periodontal conditions worsen, patients tend to experience a marked decline in their overall well-being. This connection can be understood by considering that advanced periodontitis not only causes pain, halitosis, and functional difficulties such as problems with chewing but also disrupts glycemic control, thereby amplifying systemic health risks (Tonetti et al., 2022). The data show that individuals with severe periodontal damage, reflected by deep pockets and attachment loss, are more likely to report poor quality of life, whereas those with milder conditions often maintain better functional and psychosocial outcomes. Daily limitations such as social withdrawal, heightened stress, and eating or speaking discomfort further illustrate the impact of periodontal disease on patients' lived experiences (Nazir, 2023). This relationship is reinforced by recent research showing that type 2 diabetes and periodontitis share underlying inflammatory mechanisms, including the accumulation of advanced glycation end-products, increased oxidative stress, and imbalances in cytokine activity, creating a bidirectional cycle that worsens both conditions (Zhou et al., 2024). On a global scale, data from the Global Burden of Disease Study 2021 highlight a sharp rise in severe periodontitis over the last twenty years, particularly among older adults and those with chronic illnesses such as diabetes (Collaborators, 2025). Encouragingly, a recent meta-analysis demonstrated that periodontal therapy not only enhances oral health but also improves systemic outcomes, with reductions in HbA1c and significant improvements in OHIP-14 scores, underscoring its role in boosting the quality of life for individuals living with type 2 diabetes mellitus.

CONCLUSION

The results of this study demonstrate a strong and significant association between periodontal health and quality of life among individuals with type 2 diabetes mellitus in South Barito Regency. Patients with poorer periodontal conditions consistently reported lower levels of well-being across physical, psychological, and social domains. While other factors such as gender, age, educational background, employment status, and duration of diabetes were also found to influence both periodontal health and quality of life, their effects were comparatively weaker. These findings support the study's hypothesis that declining periodontal status contributes directly to reduced quality of life in this population. Consequently, the management of type 2 diabetes mellitus should not be limited to metabolic control alone but must also incorporate regular periodontal assessment and care as an integral part of comprehensive treatment strategies aimed at improving overall patient outcomes.

REFERENCES

- Abdellatif, H. M., Binshabaib, M. S., Shawky, H. A., & ALHarthi, S. S. (2021). Association between periodontitis and genetic polymorphisms in interleukins among patients with diabetes mellitus. *Dentistry Journal*, 9(4), 45.
- Abu-Ta'a, M. (2014). The effects of smoking on periodontal disease: an evidence-based comprehensive literature review. *Open Journal of Stomatology*, 4(1), 33–41.
- (ADA), A. D. A. (2025). Diabetes management and oral care guidelines. *Diabetes Care*, 48(Suppl 1), S1–S100.
- Bajaj, S., Prasad, S., Gupta, A., & Singh, V. B. (2012). Oral manifestations in type-2 diabetes and related complications. *Indian Journal of Endocrinology and Metabolism*, 16(5), 777–779.
- Budiarto, E. (2004). *Metodologi penelitian kedokteran*. EGC.
- Collaborators, G. B. D. 2021 P. D. (2025). Global burden of severe periodontitis in 2021: An updated systematic analysis. *BMC Oral Health*, 25, 174.
- Garton, B. J., & Ford, P. J. (2012). Root caries and diabetes: risk assessing to improve oral and systemic health outcomes. *Australian Dental Journal*, 57(2), 114–122.
- Gebeyaw, E. D., & Lema, G. D. (2025). Understanding gender disparities in quality of life among patients with type 2 diabetes in Ethiopia: An institutional-based study. *Lifestyle Medicine*, 3.
- Hempler, N. F., Joensen, L. E., & Willaing, I. (2021). Social relationships, employment and health behavior in type 2 diabetes: A qualitative study. *Patient Education and Counseling*, 104(5), 1230–1236.
- (IDF), I. D. F. (2019). *IDF Diabetes Atlas (9th ed., Ed.)*. International Diabetes Federation. <https://diabetesatlas.org>
- Irani, F. C., Wassall, R. R., & Preshaw, P. M. (2015). Impact of periodontal status on oral health-related quality of life in patients with and without type 2 diabetes. *Journal of Dentistry*, 43(5), 506–511.
- Khader, Y. S. (2024). Relationship between glycemic control and oral health in T2DM. *Gulhane Medical Journal*, 66(2), 113–120.
- Lalla, E., & Papapanou, P. N. (2011). Diabetes mellitus and periodontitis: A tale of two common interrelated diseases. *Nature Reviews Endocrinology*, 7(12), 738–748.
- Leonita, E., & Muliani, A. (2015). Penggunaan obat tradisional oleh penderita diabetes mellitus dan faktor-faktor yang berhubungan di wilayah kerja Puskesmas Rejosari Pekanbaru Tahun 2015. *Jurnal Kesehatan Komunitas (Journal of Community Health)*, 3(1), 47–52.
- Lundgren, J. D. (2023). Sex and gender aspects in diabetes mellitus: Ramifications for care. *Frontiers in Public Health*, 11, 109054.
- Manderscheid, R. W. (2007). On the use of Kolmogorov-Smirnov test. *Science and Government*.
- Marmot, M., & Allen, J. (2022). Social determinants of health. *The Lancet*.
- Mukaka, M. M. (2012). Statistics corner: A guide to appropriate use of correlation coefficient in medical research. *Malawi Medical Journal*, 24(3), 69–71.
- Nazir, M. A. (2023). Prevalence of periodontal disease, its association with systemic diseases and prevention. *International Journal of Health Sciences (Qassim)*, 17(1), 5–11.

- Nizam, S. (2023). Diabetes effect on OHRQoL: Systematic review. *Frontiers in Public Health*, 11, 1112008.
- Park, K., & Ki, A. (2020). Path analysis on the biopsychosocial and economic determinants of QoL in type II DM: Evidence from Surakarta, Central Java. *Journal of Public Health*.
- Piette, J. D., & Hyman, D. J. (2014). Independent effects of socioeconomic and psychological social determinants of health on self-care and outcomes in type 2 diabetes. *Diabetes Care*.
- Plank, C. (2016). Fatigue and quality of life in type 2 diabetes mellitus. *PLOS ONE*, 11(10), e0165652. <https://doi.org/10.1371/journal.pone.0165652>
- Putri, M. H., Herijulianti, E., & Nurjannah, N. (2010). Ilmu pencegahan penyakit jaringan keras dan jaringan pendukung gigi. EGC.
- Ryan, M. E., Carnu, O., & Kamer, A. (2003). The influence of diabetes on the periodontal tissues. *The Journal of the American Dental Association*, 134, 34S-40S.
- Safkan-Seppälä, B. (2001). Periodontal disease in insulin-dependent diabetics.
- Smith, A. (2015). Diabetes and periodontal disease. In *Periodontal Disease: A Clinical and Scientific Overview* (pp. 152–178). Elsevier.
- Souza, A. B., Taboada, M., & Gonzalez, A. (2024). Effect of periodontal therapy on HbA1c and oral health-related quality of life in diabetic patients: A meta-analysis. *Healthcare (Basel)*, 12(18), 1844. <https://doi.org/10.3390/healthcare12181844>
- Tonetti, M. S., Jepsen, S., Jin, L., & Otomo-Corgel, J. (2022). Impact of the global burden of periodontal diseases on health, nutrition, and wellbeing of mankind: A call for global action. *Journal of Clinical Periodontology*, 49(4), 360–368. <https://doi.org/10.1111/jcpe.13548>
- Trikkalinou, A., Papazafiropoulou, A. K., & Melidonis, A. (2017). Type 2 diabetes and quality of life. *World Journal of Diabetes*, 8(4), 120. <https://doi.org/10.4239/wjd.v8.i4.120>
- Völzke, H. (2022). Periodontitis, age-related diseases and diabetes in an endocrinological outpatient setting (PARADIES): Cross-sectional study. *Acta Diabetologica*, 59(4), 675–686. <https://doi.org/10.1007/s00592-021-01839-2>
- Walker, R. J., Smalls, B. L., Campbell, J. A., & Egede, L. E. (2014). Impact of social determinants of health on outcomes for type 2 diabetes: A systematic review. *Endocrine*, 47(1), 29–48. <https://doi.org/10.1007/s12020-014-0195-0>
- World Health Organization. (n.d.). Report of expert and stakeholder consultations on the WHO global diabetes compact. World Health Organization.
- Wulandari, P. (2010). Hubungan Antara Diabetes Melitus Tipe 2 Dengan Destruksi Periodontal Pada Penderita Periodontitis: Relation Of Type Two Diabetes With Periodontal Destruction In Patient With Periodontitis. *Dentika: Dental Journal*, 15(2), 111–114.
- Zhang, H., & Yang, T. (2023). Examining the relationship between social support, self-efficacy, DSM and QoL among rural T2D in China. *International Journal of Environmental Research and Public Health*, 20.
- Zhou, Y., Sun, M., & Jin, L. (2024). Bioinformatic analysis of gene expression in type 2 diabetes and periodontitis reveals key pathways. *BMC Oral Health*, 24, 59. <https://doi.org/10.1186/s12903-024-04023-0>