



# Oral Health-Related Quality of Life of Hypertension and Diabetes Mellitus Patients in Chronic Disease Management Programs (Prolanis) During the Covid-19 Pandemic

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**Abstract.** The elderly population in the Special Region of Yogyakarta ranks first, with a total of 14.7 million people in 2020. The aging process causes health problems, decreased organ function, and various physical changes at all cellular, organ, and system levels, increasing disease incidence in the elderly, both at acute and chronic levels. Chronic and metabolic diseases, geriatric syndromes, manifestations or complaints due to polypharmacy and dental and oral health disorders can cause changes in the quality of life of the elderly. The aim of this study is to identify the oral health-related quality of life for patients with hypertension and diabetes mellitus in the Prolanis management program during the Covid-19 pandemic.

This research is descriptive observational with a cross-sectional design. This study included 45 participants in the Prolanis program at the Pratama Aisyiyah Moyudan Clinic, which were taken using the purposive sampling technique. The variables of this study were Oral Health-Related Quality of Life (OHRQoL) and the results of laboratory examinations of blood sugar and blood pressure. The instrument was the GOHAI (WHO) index. Analysis of the data used the frequency distribution. Most of the respondents were female (64.4%), and systemic diseases included hypertension (48.9%) and diabetes mellitus (24.4%). The highest prevalence of hypertension and diabetes mellitus was among female respondents aged 65–72 years. The average blood pressure was 139/76 mmHg, while the average blood sugar level was 115.5 mg/dl. The average OHRQoL score was 54 (medium). Hypertension and diabetes mellitus were the most common diseases experienced by female respondents aged 65–72 years. The quality of life or OHRQoL of the majority of respondents was moderate.

**Keywords:** Oral Health Related Quality of Life · DM · Hypertension · Geriatric

## 1 Introduction

Epidemiological studies show that the prevalence of DM and Glucose Tolerance Disorders (GTD) increases with age, while the number of people with hypertension is estimated to reach 1.5 billion in 2025, with mortality reaching 9.4 million. It stated that

45.5% of the elderly had hypertension, and 26.4% of the elderly had Diabetes Mellitus (DM) [1].

Diabetes mellitus experienced by the elderly can cause several manifestations in the oral cavity, including gingivitis and periodontitis, loss of gingival attachment, increased degree of tooth mobility, xerostomia, burning tongue, pain on percussion, alveolar bone resorption, and tooth loss [2]. Antihypertensive drugs can often cause side effects, such as xerostomia, gingival overgrowth, salivary gland swelling, lichenoid drug reactions, erythema multiforme, changes in the sense of taste, and paresthesia [3]. The class of antihypertensive drugs most often used by people with hypertension is calcium channel blocker (CCB). These drugs are very effective at lowering blood pressure. However, it has side effects on the oral cavity [4]. It stated that chronic diseases and disabilities are often found along with decreased organ function and physical changes. Disorders in the elderly can cause changes in the quality of life [5, 6].

Instruments that can be used to measure the quality of life are the World Health Organization Quality of Life questionnaire (WHOQOL) (WHO QOL, 1998), the Oral Health Impact Profile with 14 items (OHIP-14) and the Geriatric Oral Health Assessment Index (GOHAI). The GOHAI questionnaire assesses the quality of life based on three dimensions, namely the dimensions of functional limitations, pain, and discomfort, as well as an assessment of psychosocial aspects [7]. The GOHAI questionnaire accurately assesses the quality of life related to oral health, especially in the elderly [8].

The three main benefits of measuring the quality of life according to the IHE are (1) Discrimination, differentiating the burden of pain between groups and between individuals at a point in time, (2) Evaluation, which is measuring individual or group changes over a certain period of time, and (3) Prediction, namely the ability to predict a situation in the future. Quality of life in relation to health includes individuals' physical, functional, social, and emotional well-being during their lifetime. It is highly important to conduct research on the quality of life related to oral health-related quality of life for patients with hypertension and diabetes mellitus [7].

It stated that the quality of life assessment regarding dental and oral health has an important position for dental and oral health programs globally and is included in the targets and goals of WHO in handling dental and oral health [9, 10].

## 2 Research Method

This study involved 45 respondents who were prolans participants at the Pratama 'Aisyiyah Moyudan Clinic. This clinic was chosen from 9 other clinics Muhammadiyah in Yogyakarta with simple random sampling. The participants of prolans at this clinic were active, communicative and cooperative. Inclusion criteria included active prolans participants who were willing to be respondents. Data were collected by 2 dentists provided DHE and interview, also 1 analyst who collected blood sample for blood glucose level examination. Validation of dental health Education and interview quality of life by 2 dentists were conducted through briefing and interview guidance. All the researchers and respondents involved in data collection applied the health procedures correctly, carried them out in an open space, and arranged the meeting so that air circulation in the room was good.

## **2.1 A Subsection Sample Measurement of Blood Pressure and Blood Sugar Levels**

Measurements were carried out after the respondent agreed to the given informed consent. They were carried out by health analyst. All respondents measured blood pressure using a sphygmomanometer and random blood glucose level. Complete identities and measurement results were recorded at this stage, and respondents went to the DHE room consecutively.

## **2.2 OHRQoL Interview Using the GOHAI Questionnaire**

This stage was an interview and DHE session conducted by 2 dentists. The in-terview included complaints in the oral cavity and the duration of the pain, such as toothache, swelling, missing teeth and cavities. Respondents were given questions about their quality of life using the GOHAI questionnaire. Data were collected by 2 dentists provided DHE and interview of OHRQoL, also 1 analyst who collected blood sample for blood glucose level examination. Validation of dental health education and interview quality of life by 2 dentists were conducted through briefing and inter-view guidance. Dental Health Education (DHE) was given at the end of the interview session. The topic of DHE was based on the conditions and complaints related to the oral cavity experienced by each respondent. The average time required to conduct interviews and DHE for each respondent was 30 min.

## **2.3 Data Analysis**

The data analysis method used descriptive analysis in the form of frequency distribution and average distribution. frequency distribution was used in the data analysis of gender, age, type of systemic disease and OHRQoL of respondents. The average distribution was used to analyze the respondents' blood pressure and blood sugar levels.

## **3 Result**

The distribution of characteristics of 45 respondents in this study was based on age and gender. The respondents' age ranged from 49 to 88 years, consisting of 29 women and 19 men. The respondents' systemic diseases included diabetes mellitus, hypertension, or a combination of both. The average quality of life or OHRQoL was moderate. Most respondents had not felt any functional disturbances or discomfort in their oral cavity. Most of the respondents complained that their teeth were cavities, the teeth had been extracted, and the roots of the teeth remained. However, they did not feel any discomfort, pain or embarrassment. They felt they could chew well even though many teeth were missing; thus, the OHRQoL score remained high. Some respondents who complained of tooth pain, swollen gums, loose teeth and dryness in the mouth showed lower OHRQoL scores.

**Table 1.** Distribution of Respondents by Age and Gender

Characteristics/Types of Disease	DM	DM and Ht	Ht	Non-DM and Non-Ht
	n(%)	n(%)	n(%)	n(%)
Gender				
Male	8 (72.72)	1 (50)	14 (63.63)	6 (60)
Female	3 (27.27)	1 (50)	8 (36.37)	4 (40)
Age (years)				
49–64	5 (45.45)	0 (0)	8 (36.36)	3 (30)
65–88	6 (54.55)	2 (100)	14 (63.64)	7 (70)

\* DM: Diabetes Mellitus, Ht: Hypertension

**Table 2.** Distribution of Respondents based on OHRQoL

Characteristics	Total n(%)	Average OHRQoL	Category
Gender			Moderate
Male	16 (35.56)	53.43	
Female	29 (64.44)	54.27	Moderate
Age (years)			
49–64	16 (35.56)	54.67	Moderate
65–88	29 (64.44)	53.63	Moderate

**Table 3.** Distribution of OHRQoL in the Elderly

Types of diseases	Total (n)	Average Age	OHRQoL Score	Category OHRQoL
Diabetes Mellitus	11	64.18	53.64	Moderate
Hypertension	22	66.45	53.36	Moderate
DM and Ht	2	72	56.50	Moderate
Non DM, non Ht	10	72.90	55,20	Moderate

Most of the respondents were male, namely, 64.44%, while the age range was dominated by 65–88 years, namely, 64.44%. The most common systemic disease was hypertension, which was 48.88%. Based on the distribution of characteristics in Tables 1, 2, 3; Figs. 1 and 2, it can be stated that the number of male respondents suffered more from systemic diseases, either DM, Ht or both. Based on gender, age and type of systemic disease suffered by the respondents, the quality of life or OHRQoL was in the moderate category.

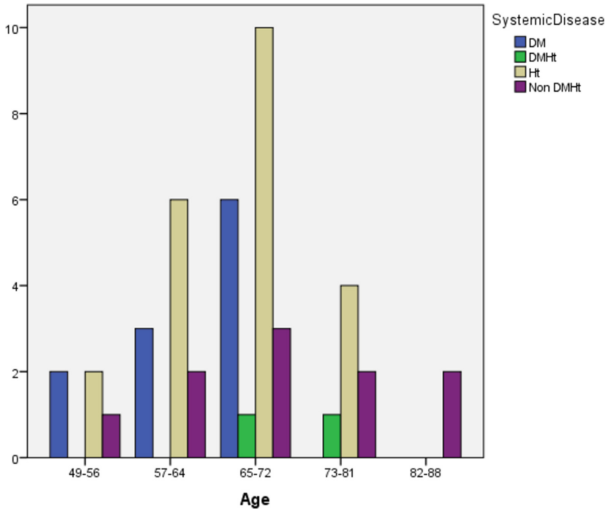


Fig. 1. Distribution of Systemic Diseases by Age.

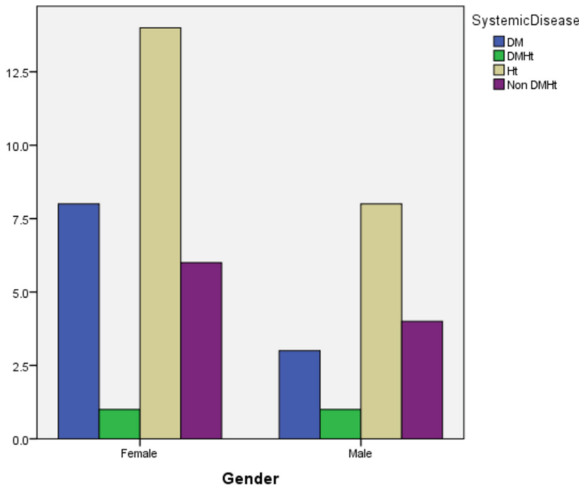


Fig. 2. Distribution of Systemic Diseases by Gender.

## 4 Discussion

The number of active participants of the PROLANIS program at the Pratama Clinic ‘Aisyiyah Moyudan Yogyakarta was 75 people. However, only 45 people participating in this study due to the Covid-19 pandemic, with 16 males and 29 females. Data collection was carried out by applying the health protocol. Systemic diseases suffered by most of the PROLANIS participants at the ‘Aisyiyah Moyudan Pratama Clinic were hypertension, DM, and a combination of both. The most common disease was hypertension.

Systemic diseases such as hypertension and diabetes affect OHRQoL. DM can worsen dental and oral health by increasing the incidence of gingivitis, periodontitis, alveolar bone damage, and xerostomia. DM patients in this study were 11 people with an average age of 64 years, with the moderate OHRQoL category. The interview results revealed that most DM patients did not feel any pain in their oral cavity, although their teeth had caries, and some had been lost or extracted. Only the respondents with pain in their teeth felt a disturbance in the comfort and functional aspects. Diabetes mellitus complications significantly impact the quality of life and health care costs [11]. Diabetic patients may be more likely to focus on other health problems than their oral health. It shows the cause of dental and oral disorders on OHRQoL [12].

Hypertension is the most common systemic disease suffered by the participants of PROLANIS Pratama Clinic 'Aisyiyah Moyudan Yogyakarta, with a total of 22 people with an average age of 66 years. Hypertension in the elderly has an impact on OHRQoL. Oral manifestations that commonly occur in hypertensive patients are caused by the consumption of antihypertensive drugs. The manifestations include gingival bleeding with redness characteristic of the marginal gingiva, hyposalivation, lichenoid, facial nerve paralysis and gingival swelling. Other complaints that arise are a gritty taste in the mouth, speaking, chewing, and swallowing difficulty due to a lack of saliva production, which can cause xerostomia [3]. The category of antihypertensive drugs most often used by people with hypertension is calcium channel blocker. This drug is very effective for lowering blood pressure, but it has side effects on the oral cavity [4].

Based on interview respondents with hypertension it was found most of them did not feel any comfort or functional or psychological disturbances because OHRQoL dimensions, namely physical function, discomfort or pain, and psychological function, had not specifically and sensitively assessed the quality of life of respondents. It could be caused by environmental factors in which the respondent lived, education level, occupation, and independence. The Moyudan area is a rural area where most people's livelihoods are farmers and traders. Although their teeth are missing, residents in rural areas continue to carry out their daily activities. They usually consume soft food that they can still chew even though their teeth are missing. The food is usually in the form of porridge or *jenang* (soft cake), which are low-fiber and high-sugar foods that will trigger the emergence of other systemic diseases.

In general, the elderly population tended to encounter weaknesses, limitations, and disabilities; thus, their quality of life decreased [13, 14]. The potential of the elderly can be maintained, cared for and even actualized to achieve their optimal quality of life (optimum aging). It can be interpreted as the maximum or optimal functional condition of the elderly to allow them to enjoy their old age with full meaning, happiness, usefulness and quality [15, 16].

## 5 Conclusion

Based on the result of the study, it can be concluded that the oral health-related quality of life for patients with hypertension and diabetes mellitus in the ProLANIS management was in the moderate category. Furthermore, the most common systemic disease was hypertension.

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## References

1. Adrian, SJ.: Essential Hypertension: Newest Diagnosis and Management in Adults. *Mirror of the World of Medicine*, 46 (3), 172-173 (2019).
2. Ermawati, T. Periodontitis and Diabetes Mellitus.: *Stomatognathic Journal of Dentistry*, 9 (3), 152–154 (2015).
3. Kumar, P., Mastan, KMK, Chowdhary, R., Shanmugam, K.: Oral Manifestations in Hypertensive Patients: A Clinical Study. *Journal of Oral and Maxillofacial Pathology: JOMFP*, 16 (2), 215 (2012).
4. Tambuwun, PG, Suling, PL, Mintjelungan, CN.: Overview of Complaints in the Oral Cavity on Antihypertensive Drug Users at the Internal Medicine Polyclinic, Level III Hospital, Robert Wolter Mongisidi, Manado. *E-Gear*, 3 (2).243 (2015).
5. Power, M., and Schmidt, S.: The WHOQOL-OLD Module-Manual, World Health Organization European Office, Copenhagen, p. 5-7 (2006).
6. Oliveira, E. J. P., Rocha, V. F. B., Nogueira, D. A., and Pereira, A. A.: Quality of Life And Oral Health Among Hypertensive And Diabetic People In A Brazilian Southeastern City. *Ciencia dan Saude Coletiva*, 23, 763-772 (2018).
7. Agustina, D., Hanindriyo, L., Widita, E., Widyaningrum, R.: The Correlation between the occurrence of dental caries and oral health-related quality of life (OHRQoL0 of the elderly population in Yogyakarta Special Region, *J Med Sci*, 50 (2): 191–200 (2018). DOI: <https://doi.org/10.19106/JMedSci005002201808>
8. Saintrain ,MFDL., De Souza , EHA. and Caldas Júnior , ADF.: Geriatric dentistry in Brazilian universities, *Gerodontology* , 23(4): 231–236 (2006). <https://doi.org/10.1111/j.1741-2358.2006.00128.x>
9. Bramantoro, T.: *Quality of Life in Early Childhood Related to Dental Health*. Surabaya: Airlangga University Press. (2016)
10. Razak, P, A., Richard, KM, J., Thankachan, Rekha, P, Hafiz, KAA., Kumar, K., Sameer, K.: Geriatric Oral Health : A Review Article. *Jurnal of International Oral Health*, 6(6): 110–116 (2014).
11. Mauri-Obradors, E., Estrugo-Devesa, A., Vinas, M., Lopez-Lopez, J.: Oral manifestations of Diabetes Mellitus. A systematic review, *Med Oral Patol Oral Cir Bucal* , 22 (5) : e586-94 (2017).
12. Khalifa, N., Rahman, B., Gaintantzopoulou, MD, Al-Ahmad, S., Awad, MM.: Oral health status and oral health-related quality of life among patients with type 2 diabetes mellitus in the United Arab Emirates: a matched case-control study, *Health and Quality of Life Outcomes*, 18(182):1-8 (2020). <https://doi.org/10.1186/s12955-020-01418-9>
13. Yuliati A, Baroya 1 N, and Ririanty M.: Differences in the quality of life of the elderly who live in the community (the difference in the quality of life among the elderly who live in the community and social services). *e-Jurnal Pustaka Kesehatan* , 2 (1) : 87–8 (2014).
14. Pedersen, P., Walls, A., and Ship, J.: *Text Book of Geriatric Dentistry ; Third Edition*. UK: John Wiley and Sons Ltd. (2015).

15. Sutikno, E.: The relationship between family function and quality of life of the elderly. *Indonesian Medical Journal*. 2(1) : 73-7 (2011).
16. Petersen, P., Kandelman, D., Arpin, S., and Ogawa, H.: Global Oral Health of Older People- Call for Publik Action. *Community Dental Health*, 27(2):258 (2010).

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