

Research Report

Association between oral health care behavior and quality of life in elderly with diabetes mellitus in Menur Public Health Center, Surabaya

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ABSTRACT

Background: An elderly person is someone who is more than 60 years old. In Indonesia, there is an increase in the elderly population, increasing the prevalence of non-communicable diseases such as diabetes mellitus. Diabetes mellitus is an abnormal increase in blood glucose. In Indonesia, the prevalence of diabetes mellitus in 2018 was 2%. Diabetes mellitus causes various complications in the body, one of which is the oral cavity, which can affect quality of life.

Purpose: To analyze the relationship between oral health care behavior and the quality of life of elderly patients with diabetes mellitus in the Menur Surabaya Community Health Center. **Methods:** The study was conducted with analytic observation and a cross-sectional approach on 80 elderly people with diabetes mellitus in the Menur Community Health Center. The data were obtained using a questionnaire. The data were tested for normality using the Kolmogorov-Smirnov method, and then correlation was tested using Spearman rank correlation. **Results:** There is a significant relationship between perceived barriers, self-efficacy, and cues to action towards oral health behavior. However, there is no significant relationship between perceived susceptibility, perceived severity, perceived benefits, and quality of life towards oral health behavior. **Conclusion:** Quality of life hinges on oral health behavior, yet correlation tests reveal no significant link between oral health care and quality of life for diabetes patients, who prioritize other health facets. Age also impacts, with elders prioritizing aesthetics less than youth.

Keywords: elderly; diabetes mellitus; oral health; quality of life; medicine

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INTRODUCTION

According to Indonesian Presidential Regulation No. 88 of 2021, an elderly person is someone aged 60 years and over. An elderly person is more vulnerable to disease than someone who is younger.¹ One of the diseases that has a high potential for the elderly is diabetes mellitus. Based on the 2018 Riset Kesehatan Dasar (Basic Health Science), the prevalence of diabetes mellitus in Indonesia is 2%. This shows an increase of 0.5% compared to 2013, with the most sufferers in the age groups 55–64 years (6.3%) and 65–74 years (6%). East Java alone ranks 4th in Indonesia for the highest prevalence of diabetes, at 2%.²

Diabetes mellitus is a metabolic disease in the form of an abnormal increase in glucose in the blood, characterized by random blood sugar levels ≥ 200 mg/dL and fasting blood sugar levels ≥ 126 mg/dL.³ Diabetes is classified

into several types, but mainly type 1 and type 2 diabetes. Type 1 diabetes is caused by impaired insulin secretion and often occurs in children and adolescents, while type 2 diabetes is due to impaired insulin action and often occurs in adults and the elderly. In type 2 diabetes mellitus, there is an imbalance in insulin level and sensitivity, resulting in insulin resistance that causes hyperglycemia. The most common manifestations of diabetes mellitus in the oral cavity are fungal infections at 68%, periodontal disease at 59.6%, and xerostomia at 34–51%.⁴ This is supported by the theory that patients with diabetes mellitus tend to experience disturbances in the environmental balance in the oral cavity due to reduced buffer capacity and salivary volume and changes in oral flora.⁵ The manifestation of diabetes mellitus in the oral cavity can reduce the quality of life because in patients with diabetes mellitus there is a decrease in immune function and hyposalivation, resulting

in susceptibility to periodontal disease and caries. Both of these conditions that are not treated cause tooth loss and pain, which affect the mastication process and quality of life.⁶

Oral Health-Related Quality of Life (OHRQoL) is the measurement of oral conditions that are associated with a person's quality of life. OHRQoL is part of general health and well-being recognized by the WHO as an important segment of the Global Oral Health Program (WHO, 2003). One of the OHRQoL measurement indices is the Oral Health Index Profile-14 (OHIP-14). Based on research conducted by Agustina et al.,⁶ type 2 diabetes mellitus patients with less than 20 remaining teeth have a low quality of life.

Based on data from January–September 2023 at the Menur Community Health Center, there were 332 people with diabetes mellitus. The number obtained increased by 5.42% from the data of visits to patients with diabetes mellitus in January–September 2022, which was 314 people. One of the Menur Health Center programs that has been implemented to facilitate routine blood sugar checks in the elderly. Based on this data, a preliminary survey was conducted. From the survey results of 12 elderly diabetes mellitus patients, 100% experienced complaints of missing teeth due to shakiness and tartar, while 75% experienced complaints of cavities. Based on the explanation above, this study aims to analyze the relationship between oral health care behavior in patients with diabetes mellitus and the quality of life in elderly patients with diabetes mellitus in the Menur Surabaya Community Health Center using the Health Belief Model concept.

MATERIALS AND METHODS

This study is a cross-sectional observational quantitative analytic study. The population in this study was 80 elderly patients with diabetes mellitus in the Menur Community Health Center, with inclusion criteria being patients aged more than 60 years with a history of diabetes mellitus and residing in the Menur Community Health Center. Ethical clearance was obtained from the Health Research Ethical Clearance Commission at the Faculty of Dental Medicine

at Universitas Airlangga (1322/HRECC.FODM/XII/2023), and permission was obtained from both the informant and the location of the research site. Written informed consent was obtained from all respondents, and confidentiality was ensured. Exclusion criteria include patients with full edentulous. Sampling used the cluster random sampling method, and the sample size was determined using Lameshow's formula.

The instrument used was a questionnaire consisting of four sections. The first part was to determine the sociodemographic characteristics of the respondents. The second part used a modification of the health belief model as an approach to studying individual behavior, consisting of six domains with a total of 19 questions, namely perceived susceptibility, perceived severity, perceived benefits, perceived barriers, self-efficacy, and cues to action. Each item was rated using a four-point Likert scale ranging from 1 (strongly disagree), 2 (disagree), 3 (agree), and 4 (strongly agree). The third section was to measure respondents' behavior in maintaining oral health, which consisted of three questions about the frequency of brushing teeth, flossing, and using mouthwash. The fourth section uses a modification of the oral health index profile 14 (OHIP-14) to measure the quality of life associated with oral health, consisting of 14 questions.

Data were analyzed using Statistical Package for Social Science (SPSS) version 25.0 Windows software (IBM Corporation, Illinois, Chicago, United States). Validity (Pearson correlation) and reliability (Cronbach's alpha) tests ($p > 0.63$) stated that the data were valid and reliable. Normality test using the Kolmogorov-Smirnov test, where $p < 0.05$ states that the data is normally distributed. The relationship between variables was correlated using Spearman's rank coefficient.

RESULTS

Table 1 shows the relationship between health belief model components and quality of life towards oral health behavior. The correlation test was done using the Spearman rank test between the variables. The results show that perceived susceptibility, perceived severity, perceived benefits, and

Table 1. Correlation between health belief model components and quality of life towards oral health behavior in elderly with diabetes mellitus in Menur Community Health Center Surabaya on 8-18 November 2023

Variable	Correlation Coefficient	Sig.	Description
Perceived Susceptibility	0.072	0.523	Not Significant
Perceived Severity	0.132	0.365	Not Significant
Perceived Benefits	0.182	0.106	Not Significant
Perceived Barriers	0.301	0.007	Significant
Self-Efficacy	0.277	0.013	Significant
Cues to Action	0.233	0.038	Significant
Quality of Life	0.025	0.832	Not Significant

quality of life have no significant relationship with oral health behavior. On the other hand, perceived barriers, self-efficacy, and cues to action have a significant relationship with oral health behavior.

DISCUSSION

The elderly are more susceptible to disease than someone who is younger.¹ One disease that has a high potential for the elderly is diabetes mellitus. Diabetes mellitus can disrupt the balance of the oral environment, resulting in several clinical manifestations in the oral cavity, such as fungal infections, periodontal disease (tooth loss), and xerostomia, which can then affect the mastication process and quality of life.^{4,6} However, these conditions can be prevented by maintaining good oral health behaviors such as brushing, flossing, and rinsing with mouthwash. According to Kanjirath et al.⁵ populations with diabetes mellitus who have good oral health care behaviors have lower rates of oral disease.

Oral health behavior can be estimated with the Health Belief Model (HBM) approach to determine a person's perception of oral health, which will be implemented in daily oral health care behavior. In this study, the HBM approach was carried out on 80 elderly respondents with diabetes mellitus in the Menur Surabaya Community Health Center. The results showed that perceived susceptibility, perceived severity, perceived benefits, and self-efficacy were at a moderate level, while perceived barriers and cues to action were at a low level. In measuring the level of oral health care behavior, it was found that the majority of respondents (87.5%) had poor behavior. However, in measuring the quality of life, it was found that the majority of respondents (65%) had a good quality of life.

In this study, perceived susceptibility is the belief of elderly people with diabetes mellitus that they are vulnerable to suffering from oral and dental disease if they do not maintain good oral health. Although in this study, elderly diabetes mellitus felt moderate vulnerability, it turned out that the perceived susceptibility was not significantly related to the behavior of elderly diabetes mellitus in maintaining oral health. This can occur because the perceived susceptibility has more influence on non-recurring oral health care behaviors such as visits to the dentist. Whereas in this study, the question items regarding oral health care behavior were dominated by questions about recurring oral health care behavior.⁷

Perceived severity in this study is the belief that if an elderly person with diabetes mellitus suffers from oral and dental disease, it will be more severe than someone who is healthy. Although in this study elderly diabetes mellitus felt moderate severity, the perceived severity was not significantly related to the behavior of elderly diabetes mellitus in maintaining oral health. This condition is due to the perception that one's severity of health behavior is not entirely the same as the perception of others. This can occur due to other factors that act as precipitating factors in the results of one's thoughts about the importance of

health behavior.⁸ Thus, it can be seen that not all diabetes mellitus patients have the same perceived severity, as most respondents have a moderate perceived severity but poor oral health care behavior.

In this study, perceived benefits are the benefits obtained by elderly people with diabetes mellitus after implementing good oral health care behaviors. Although in this study, the elderly with diabetes mellitus felt moderate benefits, the perceived benefits were not significantly related to the behavior of the elderly with diabetes mellitus in maintaining oral health. According to Eccles Expectancy-Value Theory, a person will not only have benefit expectations but also consider how someone will provide value if the benefit expectations have been achieved. Thus, it can be seen that even though someone believes that something has benefits, it will not always be implemented in their behavior.⁹

Perceived barriers in this study are obstacles felt by elderly people with diabetes mellitus in implementing oral health care behaviors. In this study, a significant relationship was found between perceived barriers and oral health maintenance behavior. Elderly people with diabetes mellitus who feel high barriers will have poor oral health maintenance behavior. This is because the elderly generally experience a decrease in physical and cognitive abilities due to aging.¹⁰ Some elderly people prefer to save energy or rest instead of taking the time to clean their teeth and mouth. The elderly also tend to experience decreased memory ability, so they tend to forget instructions to maintain oral health from dentists despite previous education.¹¹

Self-efficacy referred to in this study is the belief of diabetes mellitus elderly regarding their ability to implement oral health care behavior. In this study, self-efficacy has a significant relationship to oral health care behavior. Based on Erikson's Psychosocial Theory, it is explained that the elderly are accepting of their self-integrity. Acceptance of their self-integrity can be seen that they are satisfied with their belief in doing something they have done as well as possible.¹² Based on this, it can be stated that it is natural for elderly people with diabetes mellitus to feel that they have good self-efficacy but poor oral health care behavior.

In this study, cues to action are a factor that can motivate elderly people with diabetes mellitus to be able to maintain good oral health. Cues to action variables were found to have a significant relationship with oral health care behavior. According to Bashirian et al.¹³ intervention through education on how to maintain oral health has been shown to improve oral health in the elderly. The educational methods used are counseling and socialization, as well as practical education for caregivers to help patients.

A person's quality of life is determined based on oral health care behavior. However, the correlation test between the variables of oral health care behavior and quality of life showed no significant relationship. This is because diabetes mellitus patients tend to pay more attention to other health aspects than their oral health.^{14,15} In addition, age also affects quality of life because, in general, compared to young people, the elderly pay less attention to aesthetics.

Based on this study, it can be concluded that quality of life hinges on oral health behavior, yet correlation tests reveal no significant link between oral health care and quality of life for diabetes patients, who prioritize other health facets. Age also impacts, with elders prioritizing aesthetics less than youth.

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REFERENCES

1. Saragih H, Nugrahalia M, Sartini S. Hubungan antara Diabetes Mellitus dengan Hipertensi pada Pralansia dan Lansia di Puskesmas Rambung Kota Tebing Tinggi. *J Ilm Biol UMA*. 2019 Nov 5;1(2):64–71.
2. Kementerian Kesehatan RI. Laporan Nasional Riskesdas 2018. Jakarta: : Lembaga Penerbit Badan Penelitian dan Pengembangan Kesehatan; 2019. 127–8 p.
3. Hestiana DW. Faktor-Faktor Yang Berhubungan Dengan Kepatuhan Dalam Pengelolaan Diet Pada Pasien Rawat Jalan Diabetes Mellitus Tipe 2 Di Kota Semarang. *J Heal Educ*. 2017;2(2):138–45.
4. Rohani B. Oral manifestations in patients with diabetes mellitus. *World J Diabetes*. 2019 Sep 15;10(9):485–9.
5. Kanjirath PP, Kim SE, Rohr Inglehart M. Diabetes and oral health: the importance of oral health-related behavior. *J Dent Hyg JDH*. 2011;85(4):264–72.
6. Agustina D, Purwanti N, Hanindriyo L, Naritasari F. Oral health-related quality of life in type 2 diabetic patients of Yogyakarta General Hospital. *Maj Kedokt Gigi Indones*. 2022 Apr 12;7(1):1.
7. Ashoori F, Karimi M, Mokarami H, Seif M. Using health belief model to predict oral health behaviors in girl students: A structural equation modeling. *Pediatr Dent J*. 2020 Apr;30(1):24–32.
8. Joanna H. Introduction to Health Behavior Theory 3rd Edition. Burlington: Jones & Bartlett Learning; 2019. 57–67 p.
9. Eccles JS, Wigfield A. From expectancy-value theory to situated expectancy-value theory: A developmental, social cognitive, and sociocultural perspective on motivation. *Contemp Educ Psychol*. 2020 Apr;61:101859.
10. Pangandaheng ND, Medea GP. Deteksi Dini Ingatan (Memori) Pada Lansia Dengan Menggunakan Short Portable Mental Status Questionnaire (Spmsq) Di Kampung Belengan Kecamatan Manganitu. *J Ilm Tatengkorang*. 2022 Mar 1;6(1):43–8.
11. Konstantopoulou K, Kossioni AE. Association between Oral Hygiene Information Sources and Daily Dental and Denture Care Practices in Urban Community-Dwelling Older Adults. *J Clin Med*. 2023 Apr 14;12(8):2881.
12. Cahyanti RB, Sari FS, Putri DSR. Gambaran Integritas Diri Pada Lansia Di Panti Wredha (Overview of Elderly Self-integrity in Elderly Nursing Home). *J Kesehat*. 2020 Dec 18;9(2):120.
13. Bashirian S, Khoshravesh S, Ayubi E, Karimi-Shahanjarini A, Shirahmadi S, Solaymani PF. The impact of health education interventions on oral health promotion among older people: a systematic review. *BMC Geriatr*. 2023 Sep 11;23(1): 548.
14. Mohseni Homagarani Y, Adlparvar K, Teimuri S, Tarrahi MJ, Nilchian F. The effect of diabetes mellitus on oral health-related quality of life: A systematic review and meta-analysis study. *Front public Heal*. 2023;11:1112008.
15. Sosiawan A, Azhar IS, Dhywinanda DE, Jordana J, Salim JF, Nugraha AP. The Effectiveness of Photodynamic Therapy as An Adjunct to Mechanical Debridement in Peri-Implantitis Treatment. *Indones J Dent Med*. 2022 Dec 2; 5(2):62–5.