

Quality of Life and Its Relationship with Periodontal Disease

Kualitas Hidup dan Hubungannya dengan Penyakit Periodontal

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Abstract

Periodontal disease is an inflammatory disease of the teeth-supporting tissues which consist of the gingiva, alveolar bone, cementum, and periodontal ligament. Enlargement and bleeding gums preceding tooth loss are clinical symptoms of this disease. Moreover, early diagnosis is difficult for patients until severe destruction has occurred. The impacts include feelings of disturbance and discomfort that will affect the quality of life. Periodontal health is not only limited to relieving pain but also includes aesthetic purposes, preventing further damage, and maintaining general health. This is because dental and oral health is an integral part of general well-being, which allows individuals to achieve their most important goals, namely a better quality of life. This study aims to examine the relationship between quality of life and periodontal disease.

Keywords: periodontal diseases, inflammation, quality of life

Abstrak

Penyakit periodontal merupakan penyakit inflamasi yang melibatkan jaringan pendukung gigi yaitu gingiva, tulang alveolar, sementum, dan ligamen periodontal. Gambaran klinis dari penyakit ini adalah pembengkakan dan perdarahan gingiva hingga kegoyangan gigi. Awalnya, penyakit ini sering tidak sadari oleh penderitanya hingga mereka mengunjungi dokter gigi ketika terjadi kerusakan yang parah. Kerusakan akibat penyakit periodontal ini menimbulkan keluhan pada penderitanya yang membuatnya terganggu dan merasa tidak nyaman sehingga hal ini memengaruhi kualitas hidupnya. Kesehatan periodontal tidak hanya untuk menghilangkan rasa sakit tetapi juga mencakup tujuan estetika, mencegah kerusakan lebih lanjut, dan menjaga kesehatan tubuh secara umum karena kesehatan gigi dan mulut merupakan bagian integral dari kesehatan tubuh, yang memungkinkan individu untuk mencapai tujuan hidupnya yang terpenting yaitu kualitas hidup yang lebih baik. Hubungan antara kualitas hidup dengan penyakit periodontal akan dibahas di dalam tulisan ini.

Kata kunci: penyakit periodontal, inflamasi, kualitas hidup

INTRODUCTION

One of the factors that can increase dental and oral health problems is improper brushing habits. Only 2.3 % of the population in Indonesia has the correct behavior in brushing their teeth.¹ Furthermore, the 2018 Basic Health Research results showed that 57.6% of the population had dental and oral health problems, with 74.1% having periodontal disease

problems. Based on these data, 94.7% of the Indonesian population brushes their teeth every day, but only 2.8% brush properly.²

The wrong behavior and frequency of brushing teeth can lead to increased plaque formation which will trigger gingival inflammation, as one of the clinical features.^{3,4} Meanwhile, periodontal disease is

caused by dental biofilm and occurs due to the interaction between microorganisms and the host, culminating in an imbalance and a change from a healthy to a diseased state. Changes occur due to reduced host resistance and increased biofilm plaque or bacterial virulence.⁵ Periodontal disease is also associated with various systemic diseases such as diabetes, cardiovascular disease, stroke, and cancer, which are four of the seven causes of death in America in 2010.⁶

The prevalence of caries and periodontal disease is relatively high in the community. These two diseases affect not only the sufferer's physical condition but also their economic, social, and psychosocial conditions. The effect of oral health on quality of life has emerged as an area of interest. According to the World Health Organization, the condition of the oral cavity has a broad role in influencing the quality of life.⁸

Periodontitis is a periodontal disease with a high prevalence in adults⁹ and has a negative impact on quality of life. This is in line with De Baz *et al.*¹⁰, which showed that postmenopausal women with chronic periodontitis had a significantly poor quality of life compared to healthy samples. Consequently, doctors who treat postmenopausal women must be aware that diseases in the oral cavity, especially periodontitis, can negatively affect the quality of life.

Jansson *et al.*¹¹ showed that quality of life might be reduced in subjects missing more than 30% of their teeth and experiencing bone loss of 1/3 of teeth root length or more. This is in line with Shah *et al.*¹² which found evidence of a relationship between the severity of periodontal disease and quality of life, namely a gradual decrease in quality of life scores with increasing pocket depth and attachment loss. This means that this condition occurs not only in those with generalized periodontitis but also in patients with localized types.

The concept of quality of life (QoL) broadly includes how a person measures goodness towards various aspects of life. It is currently recognized as a valid parameter for assessing any patient's physical and mental health, including oral health.¹³ Quality of life in the aspect of oral health is defined as an individual's assessment of how it affects their well-being, namely functional, psychological, and social factors, as well as the experience of pain discomfort related to orofacial problems.^{7,14} The focus is on aspects of human life influenced by oral health and dental care.¹⁵

Wellapuli *et al.*¹⁶ showed that the impact of the oral cavity on the quality of life was 48% and 69% in pa-

tients with moderate and severe periodontitis, compared to those suffering from mild or without periodontitis, respectively. This is in line with Hijryana *et al.*¹⁷, which showed that loose teeth, a sign of progressive periodontal disease, were associated with Oral Health Related Quality of Life (OHRQoL). Due to the scarcity in the number of studies on the quality of life in terms of dental and oral health on periodontal disease, this study aims to describe the impact of periodontal disease on the quality of life in dental and oral health aspects.

Aside from dental caries, periodontal disease is one of the most common diseases in the world and includes most of the gingivitis and periodontitis. In susceptible individuals, gingivitis can progress to periodontitis, a chronic inflammatory condition of the gingiva that destroys connective tissue and alveolar bone eventually causing tooth lost.^{18,19}

The hallmark of periodontitis is that the disease is caused by a microbial community comprising about 500 species of bacteria. The human body contains a variety of distinctive ecosystems that provide a unique environment for the colony of microorganisms. Besides, the oral cavity has many surfaces for microbial colonization. The epithelial surface undergoes continuous turnover but some of the most pathogenic bacterial species are capable of invading gingival cells and tissues, although bacteria can persistently survive and evade various immune cells. The pathogenesis of periodontitis was elucidated gradually in the late 20th century. In the 1960s and 1970s, investigations in humans and animals showed that bacteria play an essential role in initiating gingivitis and periodontitis.^{19,20}

The prevalence of periodontal disease in the adult population globally ranges from 5 to 20%. Periodontitis is the second largest oral health problem and affects 10 to 15% of the world's population.⁹ It is an inflammatory disease caused by a complex of specific bacteria in dental plaque culminating in the loss of the gingiva and alveolar bone attachment. Mild to moderate chronic periodontitis is a common condition with a prevalence ranging from 13% to 57%, depending on the characteristics and severity of the case.²¹

Periodontal pathogens induce cytokine and chemokines production by the gingival epithelium, culminating in adhesion molecule expression, increased gingival capillary permeability, and chemotaxis of neutrophil polymorphonuclear to junctional epithelium through the gingival sulcus. When this process continues, the inflammation will continue to extend deep into the tissues and cause the loss of supporting

connective tissue and alveolar bone which in turn, leads to the formation of periodontal pockets. These pathological events shape and characterize the condition known as periodontitis.²⁰

Periodontitis is initiated by a complex and diverse biofilm that forms on the teeth, while dental plaque, which contains bacteria and has developed as a biofilm, cannot be removed easily from the teeth, mucosa, and root surfaces. Meanwhile, the dental plaque will then harden and calcify into calculus. Substances released from these biofilms, such as lipopolysaccharides, antigens, and other virulence factors, gain access to gingival tissues and initiate inflammatory and immune responses, leading to the activation of host defense cells. Due to the cellular activation, inflammatory mediators, including cytokines, chemokines, arachidonic acid metabolites, and proteolytic enzymes, collectively contribute to tissue damage and bone resorption.¹⁹ Bacteria can cause periodontal destruction either directly or indirectly. Cytotoxic immune cell responses and pro-inflammatory cytokines such as interleukin-1 β , tumor necrosis factor- α , and interleukin-6 play a role in periodontal tissue destruction.^{5,22}

The stages of periodontitis begin with the initial lesion is the response of local leukocytes and endothelial cells to the biofilm. At this stage, there are no clinical signs of inflammation, but tissue changes can be observed histologically. Neutrophils leave blood vessels and migrate to areas of inflammation in response to chemokines.²³

This is then followed by an early lesion, at this stage, the number of neutrophils in the connective tissue increases, accompanied by macrophages, lymphocytes, plasma cells, and mast cells. Complement proteins are activated, while the epithelium proliferates to form rete pegs, and clinical signs of gingival inflammation such as bleeding appear, followed by increased gingival fluid flow. The next stage is established lesion and is considered the transition period from the innate to the acquired immune response. Macrophages, plasma cells, and T and B lymphocytes are predominant, with the presence of B lymphocyte immunoglobulin (Ig) G1 and IgG3 subclasses. Blood flow is impaired, and collagenolytic activity is increased. Clinically, this stage is between moderate and severe gingivitis with gingival bleeding as well as changes in color and contour. The last stage is the transition to periodontitis, namely advanced lesion. The inflammatory lesion extends deeper, affecting the alveolar bone. At this stage, there is continuous irreversible bone and attachment loss.^{20,23-25}

The clinical features of periodontitis include attachment loss, pocket depth, and gingival bleeding which is mostly absent. In some patients, the progression of the disease leads to tooth mobility and migration, but most of these conditions have a less significant effect, and the progression is slow in many patients, hence, it is often referred to as a silent disease.¹²

More than 100 definitions of quality of life have been proposed, and over 1000 measurements aspects have been identified.²⁶ The concept broadly includes how a person measures 'goodness' in various aspects of his life. This evaluation consists of a person's emotional reaction to an event, disposition, sense of fulfillment as well as satisfaction with work and personal relationships.¹³

Several types of methods can be applied when assessing the quality of life in the health aspect, namely the generic form to determine the quality of life in healthy and sick people, or to compare patients suffering from various diseases, and specific methods in patients with one particular type of disease or related symptoms.²⁷⁻²⁹ Generic instruments do not have questions for particular conditions and diseases, while specific instruments have the same statements covering certain questions. Furthermore, generic instruments cannot be used to assess the quality of life in disease because the conditions have different clinical features but the measures can be used on almost any type of respondent or population.³⁰

Quality of life is currently recognized as a valid parameter for assessing any patient's physical and mental status, including oral health.³¹ OHRQoL is a multidimensional construct that reflects people's comfort when eating, sleeping, and engaging in social interaction, pride, and satisfaction with oral health.³²

Some considerations when OHRQoL is used in investigations are the specific purpose of the assessment as studies may range from assessing oral health impacts by comparing the benefits of treatment on society to comparing results across age groups. Moreover, the instrument should be able to differentiate between the disease status and have the potential for diagnosis or treatment in certain groups.¹⁴ Various results from the periodontal disease on quality of life in terms of dental and oral health have significant implications regarding assessment, planning, and treatment at the next visit. The OHRQoL measurement can be used for periodontal disease prevention programs to help improve quality of life.³³

Periodontal disease is a chronic disease with a high prevalence worldwide and is related to other condi-

tions such as heart disease, rheumatoid arthritis, and pneumonia. Regarding the clinical signs and its effect, there is debate over whether periodontal disease is a silent disease, or it affects the quality of life.³⁴

A clinician can detect signs and the stages of healing to establish the occurrence of inflammation. Meanwhile, not all signs of inflammation are present, for example, pain and loss of function are not always present or common in this condition.⁵ Bernabe³⁵ demonstrated that regardless of sociodemographic influences and other conditions occurring in the oral cavity, periodontal disease is associated with quality of life in individuals with chronic generalized and localized chronic periodontitis.

The loss of supporting periodontal structures due to periodontitis can negatively affect the periodontium. Loss of periodontal supporting structures has a negative effect on the masticatory system and the patient's quality of life. Questionnaires on quality of life in terms of dental and oral health can be used to measure individual perceptions about the social impact of oral disorders on well-being.³⁶

DISCUSSION

A healthy smile greatly influences psychosocial interactions, self-confidence, and its relationships, while a healthy oral cavity, free from pathological conditions is always the goal of dentists in treating patients.^{8,10,11} Chronic periodontitis is an inflammation caused by a complex interaction between bacterial plaque, host mechanisms, and various behavioral, environmental, and genetic risk factors that cause periodontal tissue destruction. Although the disease is asymptomatic in the early stages, chronic periodontitis can cause disorders such as gingival recession and pathological migration to tooth loss, which can significantly affect a person's physical and psycho-social health. Furthermore, periodontal disease is associated with poor OHRQoL.³⁷

The instruments used to measure the quality of life in terms of dental and oral health are divided into generic and specific. The generic instruments include the oral health impact profile-49 (OHIP-49), OHIP-14, oral impacts on daily performance (OIDP), and the oral health quality of life inventory (OH-QOL). Meanwhile, specific instruments adapted to certain conditions/domains are, oral health impact profile-aesthetic (OHIP-aesthetic), OHRQOL for dental hygiene or specific population, child oral health quality of life (COHQOL), Child-OIDP for children, as well as geriatric-general oral health assessment index (GOHAI) for older adults.^{38,39}

The oral health impact profile (OHIP) is a generic instrument for measuring the quality of life in terms of dental and oral health, but it has limited functionality. These functional limitations are associated with acute conditions such as difficulty in pronouncing words, pain, and disability.^{8,10} Quality of life instruments in dentistry usually only address occupational, psychosocial, and systemic diseases associated with their final condition. Therefore, chronic diseases that are included in the mild category can expand over time.⁸

The effect of periodontal disease on quality of life is more pronounced in severe cases. The status examination is carried out with a complete oral cavity evaluation to improve the ability to detect the impact of periodontal disease on the quality of life. It is important to consider the limitations of measurement tools in the dental part of the mouth in relation to differences in expectations, perceptions of health, and diseases or disorders in different cultures.¹⁶

The pocket depth examination can measure the general disease status and attachment loss which represents periodontal destruction and is described by the loss of gingival tissue. Although unavoidably associated with inflammation, gingival recession is one of the significant conditions that can decrease OHRQoL. This is because the exposed tooth root surface makes the subject avoid showing the gingiva when smiling.⁴²

Jowett *et al.*⁴³ used OHIP-14 to assess the impact of periodontal disease on QoL. This study also used a similar instrument to measure the OHRQoL. Meanwhile, this instrument can measure the effect on an individual overall oral health status, and not only periodontal disease.^{16,43} Musurrieve *et al.*⁴⁴ evaluated the quality of life in patients with chronic periodontitis. This result showed that periodontitis impacts the quality of life, where the most common negative effects were found in patients with severe chronic cases. The elements most affected are appearance, self-esteem, and the individual's overall health. This scale has been used successfully in practice, hence, it can help dentists to evaluate the quality of life among patients suffering from periodontitis quickly and easily.

Periodontal disease and quality of life in dental and oral health have been shown to influence each other.^{45,46} This disease does not weaken the patient's life but causes a decrease in quality. Severe periodontitis can cause discomfort to the patient, abscess formation, sometimes accompanied by pain, difficulty chewing, and eventually tooth loss.³⁴

The understanding of the quality of life is purely subjective, a healthy person is considered free from restrictions/limitations, aches, pains, and can integrate with social life and feel part of the environment. When the subject feels that oral health is part of general health, this will significantly affect the quality of life. Furthermore, individuals think that they have a good quality of life when their biological and social conditions are met, including oral health, in this case,

their periodontal conditions.^{45,47,48} Based on the results, measuring the quality of life in the dental and oral aspects through questionnaires should be a perspective that emphasizes health protection as the main object in treating disease and a new approach in medical science focused on the individual. Quality of life measurement can be used for prevention programs to reduce the prevalence of periodontal disease in the community.

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