

Quality of Life and Health for Patients with Chronic Periodontitis: A Qualitative Study

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Abstract

Background: Disease burden created by periodontal disease has been recognized as a global challenge. The burden of medical expenses is expected to increase continuously, parallel to the growth of the elderly population. Periodontal disease causes tooth loss if not treated early, and advanced periodontitis can cause a decline in chewing ability and word pronunciation as well as aesthetic function. These results diminish the health-related quality of life (QOL) for various populations, particularly the elderly, adults, pregnant women, and workers. Thus, not only is early detection and management of the disease necessary, but also a systematic strategy for the prevention of periodontal disease

Methods: Adults 19 years of age or older diagnosed with chronic gingivitis (K05.1) or chronic periodontitis (K05.3) under the ICD-10 codes were selected to participate in the study. Among the patients visiting the dental outpatient department, the study participants were chosen for our sample. A total of 20 participants were informed of the purpose of the study and gave consent to participate in in-depth interviews.

Results: The analysis results were summarized into the four upper categories of 'Interfering Element for Dental Care,' 'Declined Quality of Life caused by Dental Disease,' 'Satisfaction Elements after Treatment of Dental Disease,' 'Improvements for Voluntary Dental Care.' The treatment of periodontal disease has improved the health-related quality of life and enabled the participants to have positive health behaviors for dental care. Furthermore, they recognized the severity of periodontal disease and the importance of dental examinations. It enabled them to be aware of the need of societal effort for dental care awareness.

Conclusions: This study was an in-depth examination of the health-related QOL of periodontal patients through qualitative research methodology. The experiences of periodontal disease identified by this study can not only help to assess the adequacy of the current dental health-related QOL assessment tools but also recognize unmet needs regarding periodontal disease and, ultimately, to raise the awareness of periodontal disease among the general public. Based on this research, we expect that research on health-related QOL on periodontal disease would expand and revitalize the dental health system and practices.

Background

Disease burden created by periodontal disease has been recognized as a global challenge [1, 2]. Likewise, in Korea, the number of patients receiving outpatient treatment for periodontal disease has increased every year; the number of outpatients in 2012 was about eight million, and in 2017, the number exceeded 15 million for the first time [3]. This is the second highest of all medical conditions, and 1 in 3 people in Korea receive outpatient treatment for periodontal disease. The burden of medical expenses is expected to increase continuously, parallel to the growth of the elderly population, and, according to total medical care benefit-cost analysis, periodontal disease had the highest share among all diseases with a cost of 1,241,907,934 won (Korean currency), indicating the extreme economic burden of the disease [3].

Periodontal disease is a chronic inflammation condition accompanied by deterioration of the surrounding connective tissue and alveolar bone, and sometimes loss of tooth [4]. In most cases, unfortunately, the disease is left untreated as it shows no indication of discomfort at the early stage of the advancement—detectable symptoms only occur after extensive progression of the disease. It has been reported that there is a profound association between periodontal disease and systemic diseases as the untreated and neglected periodontal disease could cause cardiovascular disease, risk of premature birth, and other diseases [5]. Thus, not only is early detection and management of the disease necessary, but also a systematic strategy for the prevention of periodontal disease [6].

Periodontal disease causes tooth loss if not treated early, and advanced periodontitis can lead to a decline in chewing ability, word pronunciation, as well as aesthetic function. These results diminish the health-related quality of life (QOL) for various populations, particularly the elderly, adults, pregnant women, and workers [7–11]. Some primary examples of impacts on QOL include limited food consumption caused by weakened chewing function, development of gastrointestinal disorders and nutritional imbalances, and inability to comfortably converse and interact socially. Pain from periodontal disease can also lead to absenteeism from work and sleep disorders, resulting in economic damages. Thus, evaluating health-related QOL in the treatment and management of periodontal disease is necessary to allow for designing interventions and monitoring improvements related to the disease burden.

However, qualitative studies exploring the life experiences of periodontal patients in depth are insufficient worldwide [12]. In terms of health-related QOL, information from quantitative evaluations does not easily translate into an understanding of the various issues for patients. Further studies are necessary to obtain foundational data that could enhance the health-related QOL of periodontal disease patients through identifying life experiences pertaining to health-related QOL for patients with chronic dental disease. Therefore, this study applied a qualitative research method using in-depth interviews with periodontal disease patients to multifariously examine their experiences and clarify their health-related QOL.

Methods

The current study explored periodontal disease from among several chronic diseases known to be the leading causes of declining health-related QOL. Specifically, we conducted in-depth semi-structured interviews with people living with periodontal disease to multifariously understand their health-related QOL.

Research Participants

Adults 19 years of age or older diagnosed with chronic gingivitis (K05.1) or chronic periodontitis (K05.3) under the ICD-10 codes were selected to participate in the study. Among the patients visiting the dental outpatient department in one university clinic, the study participants were chosen for our sample with the assistance of a periodontist. A total of 20 participants were informed of the purpose of the study and gave consent to participate in in-depth interviews. One participant was excluded after the initial interview

revealed that they had completed the periodontal disease treatment, needed only one dental exam per year, and had no health issues relating to the study. Therefore, a total of 19 patients were selected as participants. The participants were compensated with 30,000 won for the study engagement. The specific socio-demographic characteristics of individual participants are shown in Table 1.

Data Collection Method and Process

A designated researcher explained in detail the purpose and specific contents of the study to each participant, and in-depth interviews were conducted with those who gave their consent. The semi-structured one-on-one interviews were conducted from January 7, 2019, to March 29, 2019, and were held in the hospital conference room where the participants could talk quietly and comfortably. Each participant was interviewed once. The interview content was evaluated by one preventive medicine professor and one periodontist for appropriateness of questions prior to being used with the participants. A second review was done following the first two participant interviews to finalize the content. The specific questions in the guidelines included: (1) "Did you consistently receive and manage your dental care before your periodontal disease?"; (2) "What symptoms did you experience that made you think you had a gum problem before you came for dental treatment?"; (3) "What past lifestyle habits do you think led to your periodontal disease?"; (4) "What difficulties have you experienced since you developed periodontal disease?"; (5) "In what ways did your QOL change after developing periodontal disease (compared to before)?"; and (6) "What efforts have you made to cure your periodontal disease?"

During the in-depth interviews, the participants naturally mentioned changes in their perceptions of dentistry, changes in QOL due to periodontal disease, and changes in their overall attitudes towards treatments for periodontal disease and others in their responses. A summary of the complete in-depth interview process is shown in Figure 1.

Analysis Method and Procedure

The analysis team consisted of one preventive medicine specialist, one nurse, and one preventive medicine researcher. The specialist and the researcher had extensive experience in qualitative research, and all three members had studied qualitative research methods.

The first analysis involved segmenting the transcribed data of the in-depth interviews into semantic units in order to understand the meanings of the participants' responses. The two researchers led the analysis, and the whole panel applied the procedure, as agreed upon by consensus, to derive semantic units after individually analyzing the complete transcribed data analysis. Following the classification of the responses by each researcher, we cross-reviewed the categorization results of all the participants and reached consensus through extensive discussion. Finally, the categorization framework agreed upon by the two leading researchers was reviewed by a preventive medicine specialist, and data saturation was reached when no new semantic units were discovered [13]. A summary of the entire analysis process is shown in Figure 2.

Research Validity

To ensure the validity of this study, we reviewed four criteria: truth value, applicability, consistency, and neutrality, as proposed by Guba and Lincoln [14]. In order to confirm truth value, a categorization result table was presented to one participant to assess the categorizations. The reviewer confirmed the authenticity of patients' experiences as they pertained to the categorizations. In addition, one periodontal disease patient who did not participate in the study but met the criteria for selection of participants reviewed the categorization to verify the similarity of their experiences of periodontal disease to retain applicability. Neutrality was achieved as the researchers shared preconceived notions of periodontal disease before the start of the study. Moreover, the researchers attempted to exclude any potential preconceived notions generated from the continuous discussion among the researchers during the study. Lastly, consistency was ensured as the entire process of this study was presented in detail, and the results were derived through cross-checking and discussion among researchers with experience in qualitative research.

Results

The life experiences of 19 participants with periodontal disease were reconstructed through the use of in-depth interviews. A total of 899 key results were obtained, and each semantic unit was categorized into one of four upper categories: "Interfering Elements for Dental Care," "Declined Quality of Life caused by Dental Disease," "Satisfaction Elements after Treatment of Dental Disease," "Improvements for Voluntary Dental Care." Details are shown in Table 2.

1. Interfering Element for Dental Care

1) Regrets of Previous Dental Treatment

Most participants had been to other dentists before visiting the current university hospital. The participants have had gingiva pain for numerous years and have visited the dentist for the purpose of treatment. Unfortunately, the dentists at the previous clinics and hospitals did not offer sufficient explanations about their gingiva condition and they made unconditional recommendations for tooth extraction. In addition, the previous dentists only provided medicine when the participants had toothaches and did not educate them on gingiva care. As a result, the participants did not experience any improvement in gingiva pain even after the extraction and medication consumption. Thus, they decided to receive treatment from their current dentists at the periodontal department of the university hospital voluntarily or upon the recommendation of an acquaintance.

"It's painful... When I went to a general hospital, they said they (would) have to pull it out. (Your tooth?) Yeah, like they have to pull it out." (Participant 4)

"There was pus coming out of my gums. I didn't get a precise answer when I went to that dentist, not even from another dentist." (Participant 13)

“If you go to a clinic, they only give you meds when you tell them you are in pain, no treatment like this, but just give you antibiotics and meds when you tell them it aches. So, after taking the meds, it doesn’t get better and it still wobbles... So they said I should just pull it out... Pull this one out and do (dental) implant, pull that one out and (dental) implant ...” (Participant 2)

2) Lack of Dental-Related Knowledge

Some participants were exposed to an environment where little to no attention was given to dental care for reasons such as living in an impoverished era of war or challenging living conditions. Nevertheless, they had never been educated on proper tooth-brushing techniques, even though they had visited a dentist since their living conditions have improved. Their lack of knowledge meant that they were unable to actively manage the periodontal disease symptoms, such as pus, swelling, and bleeding, and, as patients, they unconditionally obeyed the doctors' orders for tooth extraction.

“I left home to live by myself when I went to high school, so that’s when I started to brush my teeth... I mean, I didn’t know that I had to brush my teeth after breakfast; I was just busy eating my meal and went (to school) ... I used to live in (the) countryside, so I didn’t do any dental care at all... There was (also) no concept of brushing.” (Participant 3)

“When I brushed my teeth, there was a bit of blood quite often and (I) felt the swelling, but it didn’t really bother me too much, so I brushed it off.” (Participant 17)

“At the first hospital, it was so bad that they simply told me they had to pull all my teeth out in a few years, (there was) nothing (said) about they will do such and such in order to deal with this or that in what way.” (Participant 17)

3) Obstacles to Dentistry

The unique environment of the dentist was an obstacle that delayed the participants’ dentistry despite their experiencing symptoms of periodontal disease. They also stated that medical staff from different hospitals gave dissimilar treatment directions for the same dental condition and displayed a considerable variation in the requested bills, which decreased the credibility of professionalism.

“It’s scary after all, and the atmosphere, I guess? That sound and you have to like, open your mouth like this and show everything; How scary these things are (is) the biggest (reason). (Participant 16)

“I am so afraid of the anesthesia, I have a phobia (about that), so I insisted that I will get it (the treatment) from a university hospital ... because of the horror and fear, I couldn’t go (to the dentist) and I was under a situation where I couldn’t get an act of courage as well because I am a type that doesn’t get anesthetized that well.” (Participant 6)

“I think the biggest thing is distrust. Because (you worry) if you go (to the dentist) and they might scam you when you got nothing or anything (wrong with your teeth) ... You get scared when you go to

a hospital because you are sick and they say “If you don’t do this or that, you will get into big trouble,” instead of saying something like “Your condition is blah blah blah and this should be treated in this particular way.” When I hear stories (about hospital visits), it’s all different from every hospital ... Frankly, I am (a) bit skeptical a lot of times.” (Participant 17)

2. Declined Quality of Life caused by Dental Disease

1) Difficulties in Daily Life

The symptoms of periodontal disease that participants experienced were primarily presence of pus, swelling of the gingiva, tooth wobbling, bleeding, halitosis, and toothache in which the gingiva felt like a sponge. These symptoms were exacerbated when they suffered from sleep deprivation or stress. They claimed that it interrupted the daily routine and one participant said that they even felt a threat to their life.

“My teeth came up like this and when I chewed something on top (of my teeth), they suddenly slid down like chewing a sponge and then came back up. So, I looked at my gum, and (there was) pus, and the inflammation, it came out when you squeeze it; That’s why I went to the hospital ... When I brushed my teeth, I felt pus coming out and there was also a lot of bleeding when I did the brushing.” (Participant 3)

“I think sleep and gum (health) (are) very closely connected. On days when I can’t sleep and felt tired, my gums start to bleed immediately and the blood gushes out the next day.” (Participant 12)

“It was almost to the point where I immediately went into convulsion when I hear D of the dentist. Because I had really really bad teeth or gums. I went through extreme suffering that the meaning of life, I mean I couldn’t find the meaning of it ... Since I couldn’t chew on it, so I thought about death too.” (Participant 5)

2) Difficulties in Social Life

Working life and interpersonal relationships are exceptionally significant in the 21st century. Some participants were unable to properly manage their teeth while working and often abandoned their careers due to neglected dental care caused by frequent after-work drinking sessions. Likewise, in terms of interpersonal relations, halitosis or changes in teeth appearance affected by periodontal disease were a factor that intimidated them.

“I didn’t want to go to work. You know, when your teeth are like that, it’s hard to work... I can’t keep brushing my teeth ... During work, around 10 A.M., I get a coffee break and eat some sweets, but I can’t brush my teeth right then; I can brush my teeth after lunch, but it’s hard to do it thoroughly.” (Participant 1)

“Since people have been pointed out (my teeth), I automatically cover my mouth with my hands whenever I meet someone ... some people said harsh things like I look fine with my closed mouth, but I look like a

monster when I open my mouth.” (Participant 6)

3) Economic Difficulties

As one participant said, “I spent money, enough to buy a luxury car, to treat periodontal disease,” it is clear that dental treatment costs were overwhelming for them. However, some were not under this financial pressure, as they were satisfied with the cost-effectiveness of the treatment results. Most participants, however, were distressed by the large medical expenses of dental treatment. Notably, one participant shared their experience of receiving illegal dental treatment from a non-medical professional as they had failed to receive tooth scaling due to monetary difficulty.

“Just for the sake of the smooth sailing of my treatment ... I was happy. Happy, and I had faith (in the treatment).” (Participant 5)

“More than 10 million won for (the treatment of) today also. I'm getting one again this time. I am getting it done again because the previous ones were really bad, and this costs about 5 million won, so you feel extreme economic stress.” (Participant 7)

“The cost of expense is too high. I thought it was 2.5 million won as a total, but if the pillar (implant fixture) takes 1 million won, then it would cost me another pretty penny for visiting back and forth.” (Participant 1)

3. Satisfaction Elements after Treatment of Dental Disease

1) Positive Change in Daily Life

The participants who went through the periodontal disease treatment experienced various changes in their daily lives. The most significant change was the improvement of QOL resulting from the relief of the periodontal disease symptoms. Specifically, they were able to eat the food they wanted, taste the flavor of food, preserve their teeth without extraction, and sleep soundly due to toothache relief.

“It (the pain) suddenly decreased, (it did) not just simply decrease, but it got one in a million times smaller ... If before if it was 100 points, now it rapidly decreased to 1 to 5 points.” (Participant 10)

“I couldn't have eaten well before; Now I eat well ... Eating almonds was something that I couldn't imagine, but now I can. Just as an example, I can even eat almonds.” (Participant 3)

“The pain is gone, so I became 100% confident. Say, for the longest time, what would be a better hope than that we, as human beings, could all have our own teeth for the rest of our lives—it is a blessing. It is the ultimate choice to have your own teeth preserved the most for a long time. That's why I made sure to keep this tooth. Now I live without any feeling of pain at all.” (Participant 12)

2) Positive Change in Relationship

The participants who felt much discomfort in their interpersonal relationships due to periodontal disease symptoms said their halitosis and aching were reduced when they were treated for periodontal disease. As a result, they stated that the sharpness of pain disappeared, and they were happy to meet and interact with people. One participant used to cover their mouth with their hands all the time due to halitosis, and when the symptoms improved, they mentioned that they were happy to be able to be interviewed and to have a big smile.

“Tooth (health) is happiness... I have the confidence that I can speak like a normal person without pain, and I can do my job feeling better.” (Participant 5)

“I tend to recommend it (the treatment) to people around me ... I get to act in more natural ways. As I forced myself to cover it (my mouth) and unnaturally acted like this in the old days, now I can comfortably face people like this, talk like this, and laugh like this.” (Participant 6)

3) Increased Positive Awareness of Dentistry (Teeth)

Participants who have been receiving dental treatment have considered dental care to be one of the Five Blessings (longevity, wealth, health, love of virtue, and peaceful death), highly essential, and have recommended dental checkups to those around them. In the past, they had vague fears and low confidence in dentists, but they have started to experience high satisfaction and rate dentists as having high credibility because of the improvement of symptoms resulting from meeting their current medical practitioner and gaining understanding of their condition. They were particularly pleased with the departmentalized system and methodical treatment process as they transferred to the university hospital.

“They let me preserve my entire tooth. I felt really appreciative... I could do dozens of interviews like this about teeth. I really went through a lot. But (thanks to) Dr. Lee... After that (the treatment), my world changed upside down. I really went through a lot; because of my teeth...” (Participant 13)

“You know, most people, they tend to have this thought of losing quite a bit with unclarity when you go to a private hospital. ... We shouldn't jump to a conclusion, and they are valuable practitioners, but that particular thought can't escape my head. But since I've visited the university hospital, I think the credibility rose to 100%.” (Participant 12)

“I've spread the words to the people around me; You can have healthy teeth by visiting the dentist regularly to get dental checkups and care ... I should have done this care sooner, but it's a pity that I couldn't have done it.” (Participant 14)

4) Improvement of Health Behavior for Dental Care

All participants voluntarily made an effort to alleviate periodontal disease symptoms. Many of them brushed their teeth three times a day by applying proper brushing techniques learned at the hospital, and utilized dental aids such as dental floss and interdental toothbrushes. Also, based on their own periodontal disease experience, they have been actively recommending dental examinations not only for

themselves but also for their family members. Moreover, they have tried to stop smoking and abstain from drinking. Lastly, participants who were passive and depressed because of periodontal disease demonstrated positive thoughts and actively participated in the hospital treatment process.

“I used to brush my teeth for less than one minute, and nowadays I'm brushing over three minutes, not just three minutes, meticulously, I mean more meticulously. It takes longer than washing my face and hair.” (Participant 10)

“I like to use an interdental toothbrush more; That debris in that unreachable spot with a toothbrush is removable with an interdental toothbrush.” (Participant 11)

4. Improvements for Voluntary Dental Care

1) The necessity of Publicity for Dental Examination

Despite compulsory routine dental examinations, most participants did not recognize the importance of these examinations. To improve this impression, they mentioned the necessity of active promotion to raise awareness of the need for dental care through the dental examination smartphone application notification service or brochure distribution.

“You can send out a reminder service to the general public so that people can easily look into it. Or distribute an information brochure - like the notification one that you get when you reach a certain age for the free health checkup - so that you can see for yourself and recognize what periodontal disease is like.” (Participant 6)

2) The Necessity for Publicity about the Severity of Periodontal Disease

The participants were not aware of the severity of periodontal disease until their symptoms became severe. In addition, even though the symptoms were acknowledged, they tend to endure pain without treatment. This behavior resulted from ignorance and fear of the severity of periodontal disease, which requires urgent publicity, according to the participants.

“Unless it (symptom) becomes serious like mine, say you're just a little uncomfortable, then a lot, I mean most of the people don't go (to the dentist). ... (When you publicize it,) I think it will be a good idea for the Health Insurance Corporation to include a simple guidebook to help you learn about the seriousness, such as what is periodontal disease and what other organs will be affected by periodontal disease.” (Participant 6)

Discussion

This study analyzed the in-depth interviews of 19 patients with periodontal disease to examine the health-related QOL of periodontal disease in various aspects and to investigate the experiences related to periodontal disease. The analysis results were summarized into four upper categories: “Interfering

Element for Dental Care,” “Decreased Quality of Life caused by Dental Disease,” “Satisfaction Elements after Treatment of Dental Disease,” and “Improvements for Voluntary Dental Care.” In detail, the patients described regretting experiences of previous dental treatment, dental care management failure due to the lack of dental-related knowledge, experiencing difficulties in daily life and social life, as well as economic burden resulting from toothaches, bleeding, halitosis, and others symptoms of periodontal disease. The treatment of periodontal disease, however, has improved their health-related QOL and enabled the participants to embrace positive dental-health behaviors. Furthermore, they recognized the severity of periodontal disease and the importance of dental examinations. Proper treatment enabled them to be aware of the need for a societal effort toward dental care awareness.

The foremost significance of this study is that the qualitative research methodology has been used to confirm the experiences of periodontal patients in health-related QOL. Periodontal disease is one of the elements that can diminish QOL as related to health. Although precedent studies have been conducted investigating health-related QOL on periodontal patients [3-8], they struggled to comprehensively identify the all-encompassing challenges that the patients face. Health-related QOL should expansively encompass the various dimensions of health, and it is influenced by several factors such as demographic characteristics, depression and fatigue, and personal, familial, and social relationships. Moreover, health-related QOL needs to capture more than the experience of the moment—it must include the conditions and before and after treatment and the processes of change. The reality of the current practice environment only allows dental professionals a view of a small portion of patient’s life as the treatment involves a short encounter between the medical staff and the patient [15]. Thus, to accurately assess health-related QOL before and after treatment for patients with periodontal disease patients, some qualitative research methodology is required for in-depth and comprehensive exploration of periodontal disease patients.

Qualitative research, which enables interpretation of patients’ subjective experiences, can contribute to revealing overlooked or tricky details of conditions analyzed by quantitative studies, by providing analyses of contents from individual participant interviews. The term 'subjective' here indicates that the health condition is significant from the patient's perspective and that interpretation of their subjective experiences could be applied as an essential means of assessing and explaining the consequences of the disease [16].

This qualitative study endeavored to focus on the stories of periodontal patients and thoroughly observe their experiences of life with periodontal disease. The results from this study also demonstrate that not only the treatment of periodontal disease should be highlighted, but also efforts to improve the health-related QOL of periodontal disease from a social perspective.

Another primary aspect of this study is that the results confirm and reiterate the need for persistent management of periodontal disease. In particular, periodontal disease patients, after vigorous periodontal treatment, should receive regular maintenance to prevent disease recurrence. The condition of teeth rapidly deteriorates starting around the age of 40, for patients who have previously received only low-

quality treatments without maintenance. However, a combination of high-quality treatments and maintenance can dramatically improve the longevity of teeth. According to the literature on supportive periodontal therapy (SPT) or regular maintenance over five years, the average rate for tooth loss per patient per year is 0.01 to 0.31 [16–18]. Several studies have reported that regular visitation to the dentist and periodontal maintenance reduce tooth loss and loss of adhesion; therefore, there is no existing controversy over the need for periodontal treatment [19, 20]. The participants in the study act as living witnesses who have testified that the management of periodontal disease is paramount. For the regular management of periodontal disease patients, establishment of an institutional system like that in place for managing regular visits to physicians is required.

In order to prevent periodontal disease, there needs to be emphasis on dental health as well as positive habitual behaviors for prevention and management. As most of the participants accentuated, to accomplish this idea, the importance of prevention of periodontal disease and the seriousness of the disease should be promoted. It is essential to publicize the declined QOL caused by dental disease in terms of the multifarious ways QOL is impacted including daily life, social life, and economic aspects. In addition, it is necessary to ensure that visits to the dentist is mandatory for preventive purposes, rather than only for when symptoms occur. The greatest need regarding the current dental care system in South Korea is the need to teach and promote the practice of high-quality preventive care. The proportion of the population who regularly visit dentists for preventive purposes is 90% of the ages of 65 to 84 in Sweden. Unfortunately, in Korea, unmet needs still persist, and the dental examination rate is low [21-25]. The importance of awareness of dental health has not been perceived as a social convention and is vastly different from the status quo in countries with advanced dental care systems [26]. As an eye fundus examination is a part of the process for prevention of complications when a patient is diagnosed with diabetes, it is necessary to create opportunities to manage periodontal disease by normalizing practices such as receiving dental examinations to prevent periodontal disease.

Patients must be aware of the importance of dental maintenance or have the motivation to visit dentists to receive regular dental care. Similar to the participants in this study, patients who are consistently involved in dental care feel proud of and recognize the benefits of maintaining high levels of dental hygiene. In other words, a desire to maintain a healthy oral cavity and enjoy the process would become the driving force for long-term planning for regular visits to the dentists. Furthermore, self-care at home based on professional brushing training has been shown to be even more important than maintenance several times a year. Customized dental health education programs focused on individual characteristics would be more appropriate for behavioral changes than the standard ones.

As the participants of this study indicated, in the past dental care has been inconvenient; therefore, it is necessary to enhance the quality of the care. In Korea, unmet needs are being effectively reduced as result of economic changes, such as improvements to the insurance system, but there is still distrust in the quality of medical care, especially the quality of the care experienced at the clinic level of medical institutions [27]. Participants' dissatisfaction with treatment was due to receiving insufficient explanations of dental conditions, undergoing obligatory tooth extractions, and lacking education on

dental maintenance. These elements influenced them to doubt dentists and led them to make infrequent visits for dental care. It is expected that the quality of dental care will increase due to the decision to apply the Healthcare Benefit Quality Assessment, which evaluates the cost-effectiveness of the overall care provided by the health insurance, to dental health (it was previously only used in the medical field) [28]. However, improving the quality of dental care will still be a prerequisite to improving access to dental care.

The limitation of this study is that as the participants were recruited from the general hospital (university hospital), there was a limit in reflecting the experience and perception of patients who are mainly treated in dental clinics. The limitation may have resulted in a more evident demonstration of negative experiences with dental clinics. We suggest that future studies be conducted with periodontal patients who are treated by dental clinics.

Conclusions

This study was an in-depth examination of the health-related QOL of periodontal patients through qualitative research methodology. The experiences of periodontal disease identified by this study can not only help to assess the adequacy of the current dental health-related QOL assessment tools but also recognize unmet needs regarding periodontal disease and, ultimately, to raise the awareness of periodontal disease among the general public. Based on this research, we expect that research on health-related QOL on periodontal disease would expand and revitalize the dental health system and practices.

Abbreviations

QOL: quality of life; SPT: supportive periodontal therapy.

Declarations

Ethics Approval and Consent to Participate

The study was conducted after approval from the Institutional Review Board (IRB) of Ulsan A Hospital (IRB No: 2018-11-003).

Consent for Publication

All participants also provided consent for publication.

Availability of Data and Materials

All data generated or analyzed during the study are included in this article. If necessary, we can provide a complete script in Korean.

Competing Interests

The authors declare that they have no competing interests.

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Authors' Contributions

All authors contributed to the conception and design of the study. JP, ML, and JL participated in the data acquisition. All authors contributed to the analyses of data and the interpretation of data. All authors were involved in drafting the manuscript. All authors have read and approved the final manuscript.

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Tables

Table 1 Socio-demographic Characteristics of Participants

	Gender	Age	Education	Occupation	Other Diseases/ Surgery Experience	Chronic Dental Diseases Treatment Period	Monthly Income (thousand won)
1	Female	The 50s	High School	Housewife	×	4 Years	2,000
2	Female	The 50s	Elementary School	Housewife	×	4 Years	2,000
3	Male	The 50s	4-Year- University	Entrepreneur	Hypertension, Diabetes	10 Years	6,000
4	Male	The 60s	4-Year- University	Security Guard	Colon Polyp	2 Years	1,500
5	Female	The 50s	4-Year- University	Homeschool Teacher	×	1 Year	2,500
6	Female	The 50s	High School	Housewife	Hypertension	3 Years	4,500
7	Female	The 60s	4-Year- University	Housewife	×	2 Years	6,000
8	Female	The 50s	High School	Housewife	Hypertension	1 Year	5,000
9	Female	The 40s	4-Year- University	Housewife	×	2 Years	7,000
10	Male	The	2-Year-	Corporate	×	3 Years	2,500

			40s	University	Worker			
11	Female	The	40s	4-Year- University	Nurse	×	1 Year	2,500
12	Female	The	60s	4-Year- University	Housewife	Arthritis	8 Months	8,000
13	Female	The	60s	High School	Housewife	Hip Joint Surgery Experience	6 Years	3,000
14	Male	The	50s	4-Year- University	Corporate Worker	Diabetes	20 Years	6,000
15	Male	The	50s	4-Year- University	Corporate Worker	×	10 Years	7,000
16	Female	The	50s	4-Year- University	Freelancer	×	2 Years	-
17	Male	The	40s	High School	Corporate Worker	Diabetes	2 Years	4,000
18	Male	The	50s	High School	Corporate Worker	Kidney Transplant	4 Years	8,000
19	Female	The	50s	4-Year- University	Nurse	×	17 years	5,000

Table 2 Categorization Results

Upper Category	Sub Category
Interfering Element for Dental Care	Regrets of Previous Dental Treatment
	Lack of Dental-Related Knowledge
	Obstacles to Dentistry
Declined Quality of Life caused by Dental Disease	Difficulties in Daily Life
	Difficulties in Social Life
	Economic Difficulties
Satisfaction Elements after Treatment of Dental Disease	Positive Change in Daily Life
	Positive Change in Relationship
	Increased Positive Awareness of Dentistry(Teeth)
	Improvement of Health Behavior for Dental Care
Improvements for Voluntary Dental Care	The necessity of Publicity for Dental Examination
	The Necessity for Publicity about the Severity of Periodontal Disease

Figures

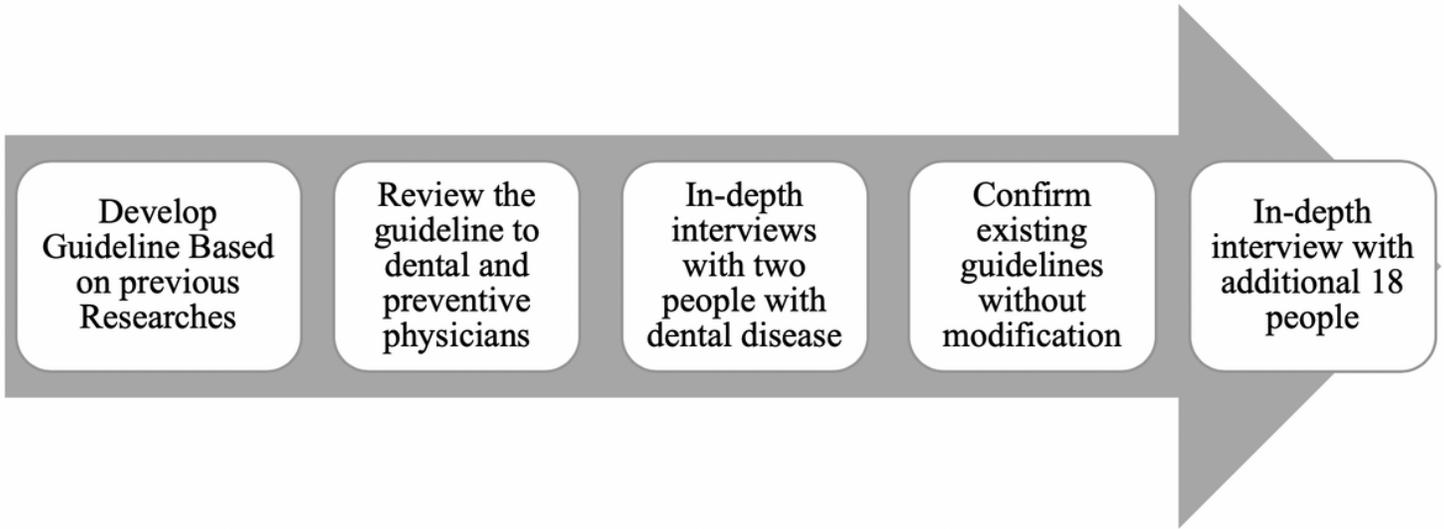


Figure 1

In-depth interview paradigm

Researcher1

Researcher2

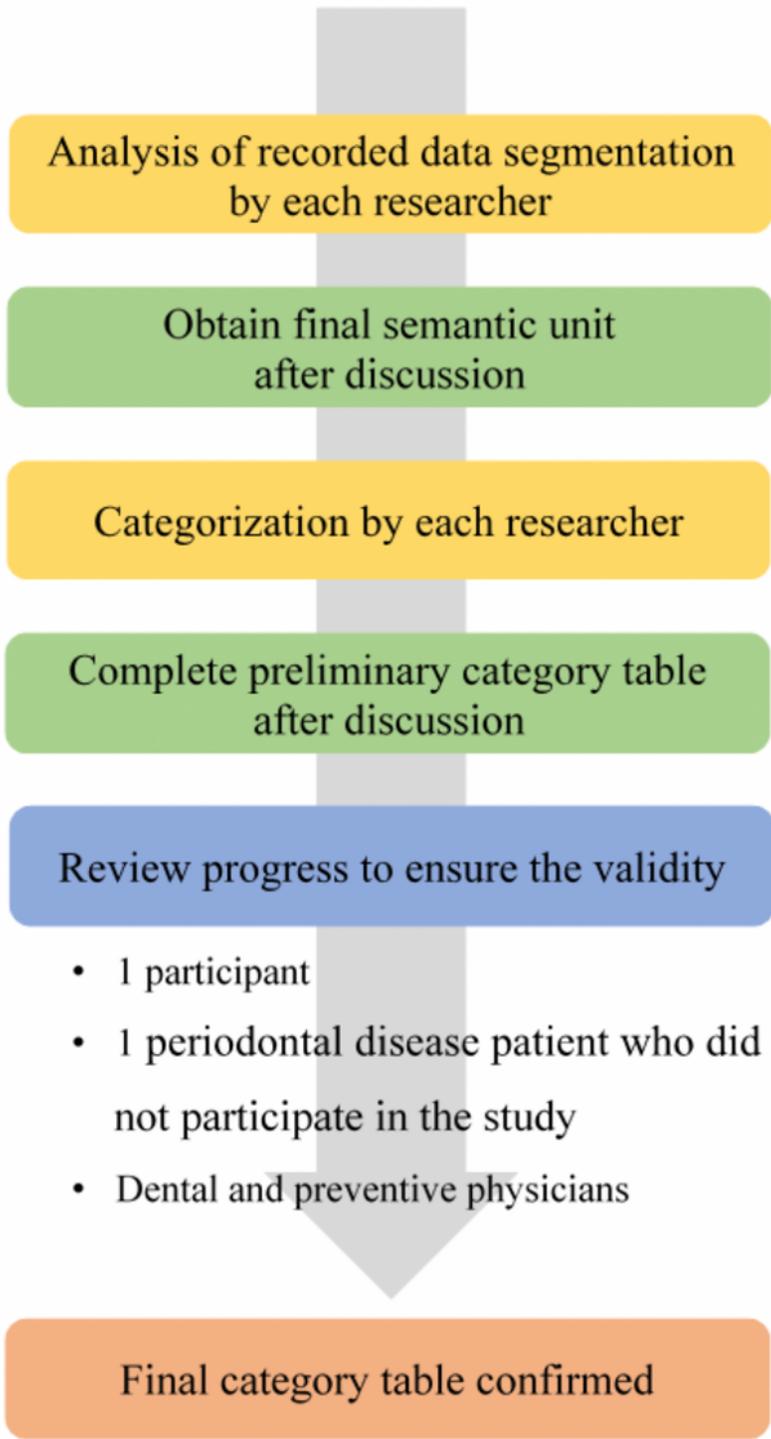


Figure 2

Analysis paradigm