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ORIGINAL RESEARCH

Oral Health-Related Quality of Life (OHRQoL) Analysis in Partially Edentulous Patients with and without Denture Therapy

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Purpose: One of the Indonesians oral health problems today is teeth loss. Several treatments can be done to overcome the problems, especially to restore missing teeth function, which are mastication, speech function, and improve aesthetic. The aim of this study was to analyze the correlation between oral health-related quality of life (OHRQoL) domains physical health, psychological health, social relationships, environment, and the domain of Oral Impact on Daily Performance (OIDP) in partially edentulous patients with implants, conventional dentures, and non-users (without implant and conventional denture).

Patients and Methods: This is a cross-sectional analytic observational study. Samples were partially edentulous patients aged 15–70 in Surabaya were taken using a simple random sampling technique within inclusion criteria. Reliability and validity analysis was carried out with Eta correlation test and then comparative analysis was performed with Kruskal Wallis and Post Hoc test with Mann Whitney *U*-Test. All procedures were carried out in accordance with the relevant guidelines and regulations by Ethics Committee, Faculty of Dental Medicine, Unair, Surabaya, Indonesia (No: 441/HRECC.FODM/VII/2022).

Results: The results showed that there was a significant correlation between partially edentulous patients with and without dentures with the domains of physical health, psychological health, social, environment, and the domain of OIDP.

Conclusion: The study showed a statistically significant correlation between OHRQoL domain of physical health, psychological health, social and environment, and the domain of OIDP in partially edentulous patients with implants, conventional dentures, and non-users (without implants and conventional dentures). Edentulism is really felt by the people and has a negative effect meaningful to the physical, economic, and psychological. For this reason, in determining the use of implants, conventional dentures, and non-users (without implants and conventional dentures) it is important to consider domains of OHRQoL consisting of physical health, psychological health, social relationships, environment, and the domain of OIDP.

Keywords: implant, physical health, psychological, social, good health and well being

Introduction

One of Indonesia's most common oral health problems nowadays is teeth loss.[1,2] Teeth loss (edentulous) is a condition where the teeth are missing or detached from the socket or causing the opposing teeth to lose attachment. Teeth loss will cause a decrease in alveolar bone, migration of side teeth and can affect the supporting tissues in receiving adequate prosthetic restoration.[1] Based on the Basic Health Research (Riskesdas) in 2018, the prevalence of teeth loss in Indonesia was 19%, with the highest percentage at the age of above 65 years old (30.6%), followed by the age of 55–64 years old (29%).[3] Unreplaced missing teeth can lead to various oral cavity problems. Teeth loss can have a substantial effect on the emotion as well as oral health and function.[4] Lack of teeth affects people's appearance, social interaction and safety.[5] There are several alternatives that can be used to replace missing dental elements, such as removable dentures, fixed

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dentures (bridges), and dental implants. Basic Health Research in 2018 stated that the prevalence of the use of dentures in Indonesia is 1.4% and in East Java it is 1.8%, while the use of dental implants in Indonesia is 0.2% and in East Java is 0.2%.[3,6,7]

Various types of treatment can be performed to solve the problem of teeth loss, especially to restore the function of the missing teeth, namely mastication, speech function, and improve overall facial aesthetic. The dentist's purpose is to assist patients with dental health rehabilitation utilizing a predetermined plan. Patients with major or minor edentulism may be unable to do a variety of tasks. The proper appearance of edentulous patients is determined by bone loss. Given that a removable prosthesis does not entirely fulfill the needs for proper appearance, speaking comfortness. The treatment option that is commonly used is the use of dentures is prosthesis, which replaces part or all of the missing teeth and their supporting tissues.[8] There are two types of dentures, namely removable and fixed dentures. Each type of denture has its own advantages and disadvantages. Dental implants are a great way to rebuild teeth and oral tissue. Therefore, many people are looking for other alternatives to replace lost teeth using dental implants.[9] Despite all these advantages, implants are not the first choice of treatment due to lack of knowledge among patients.[10]

Oral health-related quality of life (OHRQoL) is a measurement of dental and oral health related to quality of life based on individual assessments of the condition of their teeth and mouth.[11,12] There are several domains that affect oral health-related quality of life (OHRQoL) including physical health, psychological health, social relations, environment, and Oral Impact on Daily Performance (OIDP).[13]

Physical health consists of discomfort, pain, impaired mastication function, taste, speech, and perception of oral hygiene. Psychological health consists of emotional stability, anxiety, and insecurity. Social relations consist of the convenience of communicating with others, the ability to communicate, and smile. The environment consists of job, education, and economical status. The Oral Impact on Daily Performance (OIDP) consists of the impact of the mouth on an individual's ability to perform eight daily activities, which are eating, talking, cleaning teeth, sleeping, and relaxing, showing teeth without shame, maintaining emotional state, working, and social relationship.[13,14] Therefore, the purpose of this research is to analyze the correlation between Oral Health-Related Quality of Life (OHRQoL) domain physical health, psychological health, social relation, environment, Oral Impact on Daily Performance (OIDP) on the use of implants, conventional dentures, and non-users (without implant and conventional denture), thus effective steps to improve the quality of life in the community can be established.

Materials and Methods

This study is a cross-sectional analytical observational study to analyze the correlation between Oral Health-Related Quality of Life (OHRQoL) domain physical health, psychological health, social relationship, environment, Oral Impact on Daily Performance (OIDP), and partially edentulous patients on the use of implants, conventional dentures, and non-users (without implant and conventional denture). Samples were partially edentulous patients aged 15–70 years in Surabaya using a simple random sampling technique within inclusion criteria. Inclusion criteria in this study were people living in Surabaya, with age between 15 and 70 years old, and partially edentulous patients with and without implant therapy. The data obtained from questionnaires were then analyzed using a statistical program. Furthermore, the reliability and validity analysis was carried out with the Eta correlation test, and then comparative analysis was performed with the Kruskal Wallis and the Post Hoc test with the Mann Whitney *U*-Test. All methods were performed in accordance with the relevant guidelines and regulation by Ethics Committee, Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia (Number: 441/HRECC.FODM/VII/2022).

Results

Total number of research subjects was 102 respondents, consisting of 56 women (54.9%) and 46 men (45.1%). The results of the study from analytic between OHRQoL domain physical health, psychological health, social relations, environment, Oral Impact on Daily Performance (OIDP), and partially edentulous patients with and without dentures therapy showed that there was a significant correlation.

Figure 1 shows the prevalence of denture users in Surabaya was mostly without conventional dentures and implant (41.2%), and the least was implants as much as 19.6%. The prevalence without conventional dentures and implant was

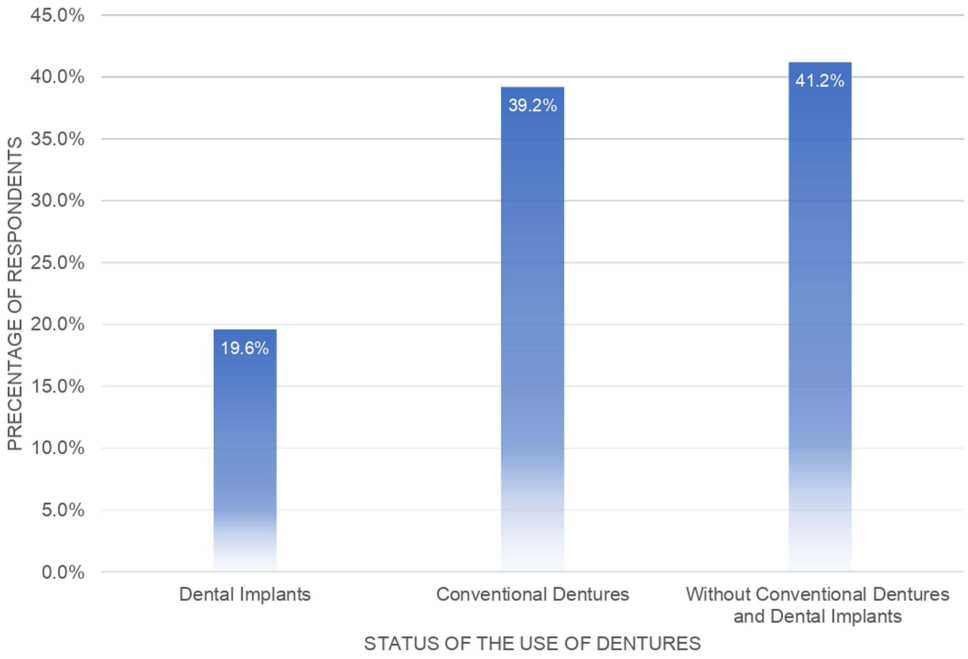

Figure 1 Prevalence of wearing denture.

quite a lot and people using dental implants are still very little, this was related to the lack of understanding of implants or the cost of implants, which were still quite expensive. Figure 2 shows characteristics of respondents by age in Surabaya. The highest was mostly age 45–54 years old (26%) while the smallest was 65–70 years old (5%).

Figure 3 shows the age distribution of denture users in the three groups. Most conventional denture users were between 45 and 54 years old (31.03%) and the smallest were at 65–70 years old (10.34%). The highest number of implant users were at the age of 45–54 years old (31.25%), and the smallest were at the age of 25–34 years and 65–70 years, namely 6.25%, respectively. Respondents who did not use implants and conventional dentures were mostly at the

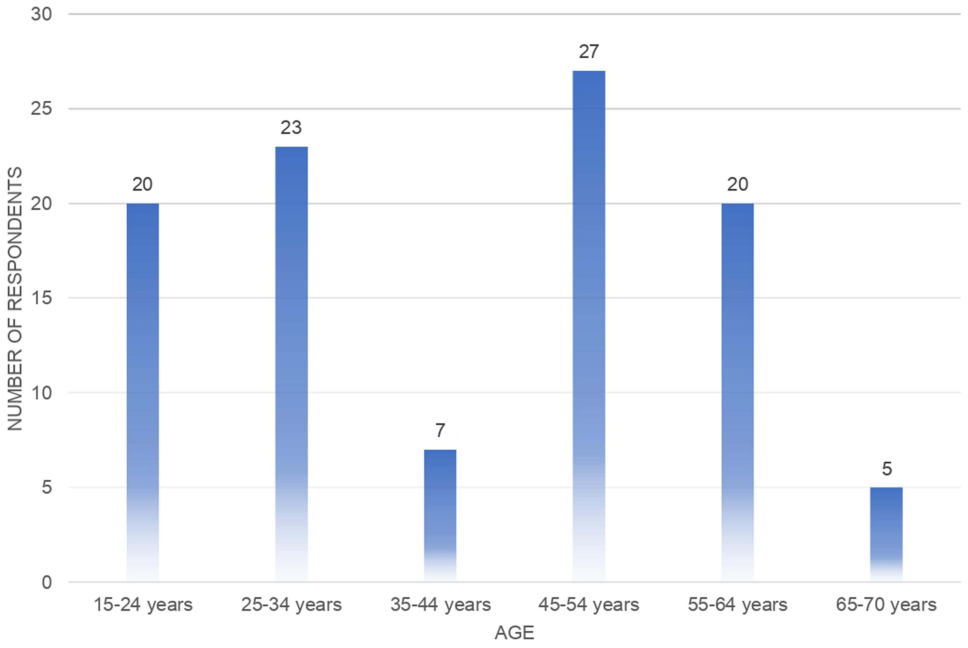

Figure 2 Characteristics of respondents by age.

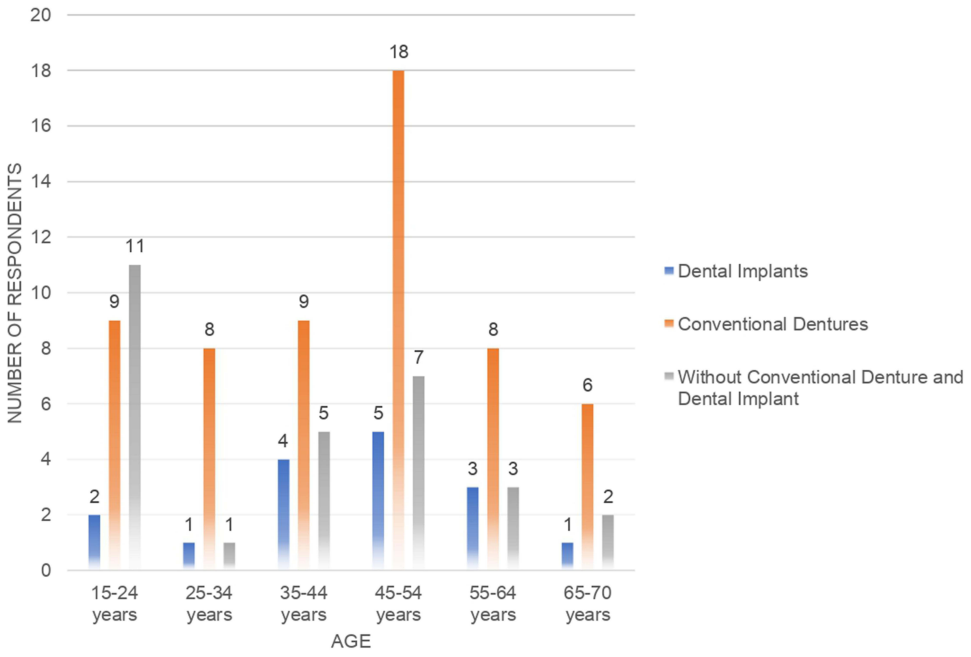

Figure 3 Age distribution in denture users.

age of 15–24 years old (37.93%) and the least are at the age of 25–34 years (3.45%). Figure 4 shows that the number of missing teeth was experienced by women (61.17%) compared to men (38.83%). From that 61.17% women group, conventional dentures were highest (50.79%), followed by implants (19.1%) and without implants and conventional dentures (30.16%). Meanwhile, from 38.83% of men with teeth loss, the percentage of conventional users dentures (65%) was highest. The rest were men without implants and conventional dentures as much as 25%, followed by dental implant (10%).

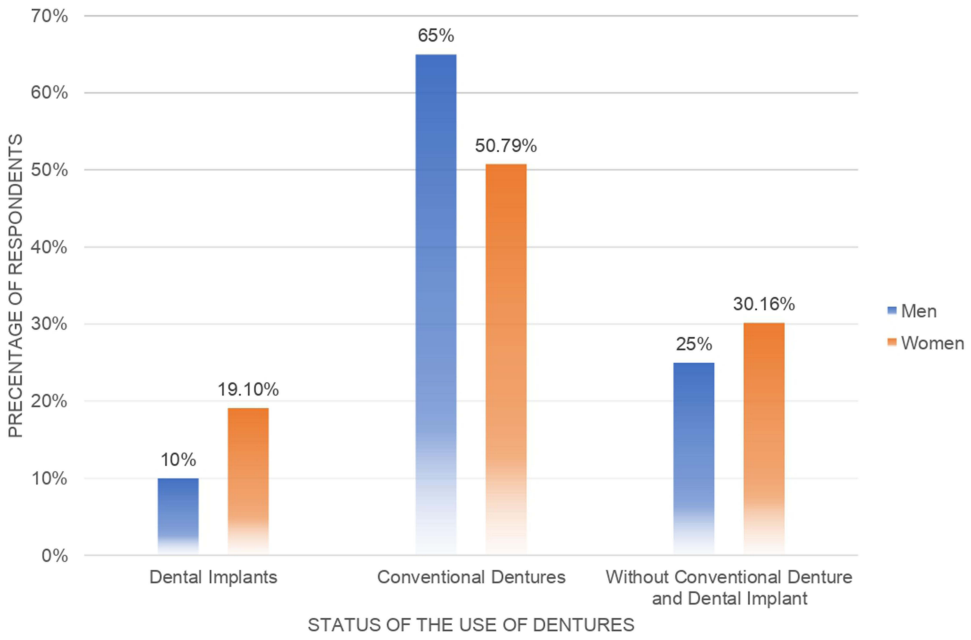

Figure 4 Prevalence of denture users by gender.

Figure 5 shows the education level of denture users as follows: The most users of conventional dentures were at the education level of college (68.97%) and the lowest was at university. Most implant users were at the high school and college education level, which were 37.5%, respectively, and the smallest were at elementary and junior high school, 6.25%, respectively. Figure 6 shows the income level of denture users as follows: the most conventional denture users were at the income level of 3–4 million (31.03%) and the lowest was at the income level of <1 million (10.35). The highest implant users were at the income level of 1–2 million and >5 million (25%) and the lowest was at 3–4 million (6.25%). Respondents without implants and conventional dentures were mostly at the income level of <1 million (31.03%) and the smallest was at the income level >5 million (3.45%.)

Table 1 shows correlation between domain OHRQoL and status of the use of dentures. The first domain is physical health, as shown in Table 1. The highest average score for respondents without dentures was 33.42 ± 8542. While the lowest average score was the Dental Implants respondents, the average score was 20.70 ± 8700. The second domain is Psychological Health, as shown in Table 1. The highest average score for respondents without implant and conventional denture was 18.42 ± 5.388. While the lowest average score was the Dental Implants respondents, the average score was

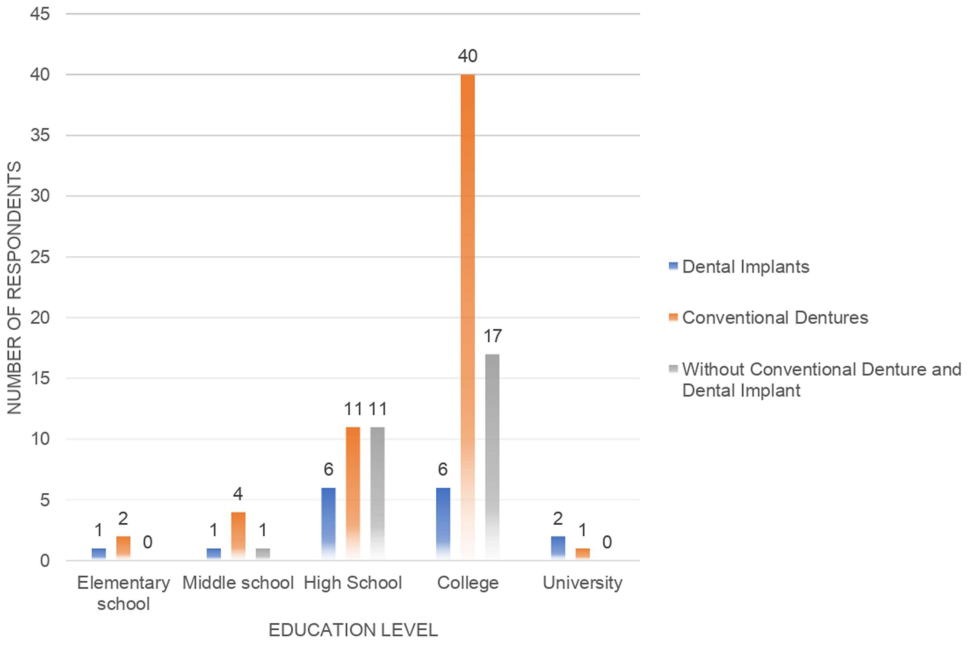

Figure 5 Distribution of education levels on the use of dentures.

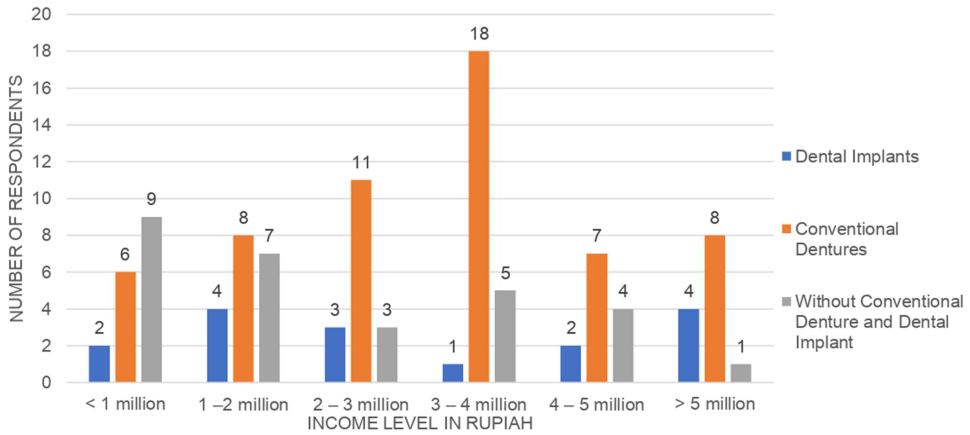

Figure 6 Distribution of income levels on denture usage status.

Table 1 Correlation Between Domain OHRQoL and Status of the Use of Dentures

Domain OHRQoL	Mean ± SD			η (Eta Coefficient)
	Status of the Use of Dentures			
	Dental Implants	Conventional Dentures	Without Implant and Conventional Denture	
Physical Health	20.70 ± 8.700	31.25 ± 5.646	33.42 ± 8.542	0.706
Psychological Health	10.70 ± 6.416	15.42 ± 3.629	18.42 ± 5.388	0.651
Social Relations	11.80 ± 4.200	16.32 ± 2.595	18.95 ± 5.716	0.651
Environment	13.80 ± 4.348	19.82 ± 2.925	22.09 ± 5.933	0.667
Oral Impact on Daily Performances	14.05 ± 7.667	20.47 ± 4.551	24.19 ± 7.574	0.689

Abbreviations: SD, standard deviation; OHRQoL, Oral Health-Related Quality of Life.

10.70 ± 6.416. The third domain is Social Relations, as shown in Table 1. The highest average score for respondents without implant and conventional denture was 18.95 ± 5716. While the lowest average score was the respondent Dental Implants, the average score was 11.80 ± 4200. The fourth domain is Social Relations, as shown in Table 1. The highest average score for respondents without implant and conventional denture was 22.09 ± 5.933. While the lowest average score was the Dental Implants respondents, with an average score 13.80 ± 4348. The fifth domain is OIDP, as shown in Table 1, the highest average score was without implant and conventional denture, the average score was 24.19 ± 7.574, while the lowest average score was dental implant users with an average score 14.05 ± 7.667.

Table 2 shows that from the test there were differences in the status of denture use in the OHRQoL domain resulting in a p value <0.05, so it can be stated that there was a significant difference between the status of denture use in the OHRQoL domain.

Table 3 shows implant users had significant differences with conventional denture users in the physical health, psychological health, social relationship, environment, and OIDP domains. Implant users had significant differences with respondents without implant and conventional denture in the physical health, psychological health, social relationship, environment, and OIDP domains. Conventional denture users did not have a significant difference with respondents without implant and conventional denture in the physical health domain, whereas conventional denture users had significant differences with respondents without implant and conventional denture in the psychological health domain, social relationships, environment, and the domains of OIDP.

Table 2 The Results of the Kruskal-Wallis Test Between the OHRQoL Domains Consisting of Physical Health, Psychological Health, Social Relationships, Environment, and Domain of OIDP for the Status of the Use of Dentures

Domain	Status of the Use of Dentures
Physical Health	0.000*
Psychological Health	0.000*
Social Relations	0.000*
Environment	0.000*
Oral Impact on Daily Performances	0.000*

Notes: *p < 0.05.

Table 3 The Results of the Mann Whitney Test Between the OHRQoL Domains Consisting of Physical Health, Psychological Health, Social Relationships, Environment, and Domain of OIDP for Implants, Conventional Dentures, and Non-Users (Without Implants and Conventional Dentures)

Domain	Group	Implants	Conventional Denture	Without Implant and Conventional Denture
Physical Health	Implants		0.001*	0.000*
	Conventional denture	0.001*		0.537
	Without implant and conventional denture	0.000*	0.537	
Psychological Health	Implants		0.048*	0.000*
	Conventional denture	0.048*		0.012*
	Without implant and conventional denture	0.000*	0.012*	
Social Relations	Implants		0.025*	0.000*
	Conventional denture	0.025*		0.002*
	Without implant and conventional denture	0.000*	0.002*	
Environment	Implants		0.001*	0.000*
	Conventional denture	0.001*		0.022*
	Without implant and conventional denture	0.000*	0.022*	
Oral Impact on Daily Performance	Implants		0.047*	0.000*
	Conventional denture	0.047*		0.005*
	Without implant and conventional denture	0.000*	0.005*	

Notes: *p < 0.05.

Discussion

The teeth and mouth are the first body parts that we notice when we meet people, and they can interfere with two important functions namely eating and speaking.[1] Patients who are completely toothless are reported to have a poorer quality of life, because their condition is related to a lack of chewing abilities, poor speech, physical pain, and aesthetic problems.[3,6] The results of this study support the statement, which shows a significant effect on various aspects of quality of life in each domain. They not only have an impact on physical and aesthetic appearance but also on social, physiological, psychological, and pain or discomfort. For this reason, evidence suggests that the prevalence of users without dentures is higher than with the use of conventional dentures and implants. The demand for implant therapy is still low. Implants are not the first choice of treatment because they use conventional dentures instead. Dental specialists have introduced implants as an appropriate treatment that implants have been practiced and accepted worldwide. However, there are several circumstances that can keep dental implants from being approved, such as economic or anatomical issues, and these can have an impact on the affected person's quality of life.

Age is considered to be an important prognostic factor in implant success. In this study, implant users were in the 45–54 years old range. Patients above 60 years old are at twice as much risk of having an adverse outcome than patients under 60 years old. Older patients are more susceptible to systemic health condition changes, have poor local bone conditions and potentially longer healing time.[15] Moy et al studied that advancing age increased the risk of implant failure. Men tended to

choose using conventional dentures with a higher percentage than women, but the use of implants was higher in women, while without dentures use was higher in women than men.[16] The reasons for not wearing dentures were lack of information about dentures, expensive prices, and less comfortable after using them. Denture implant users in general had a final education level of college and university with aesthetics as the reason for using it. Partial removable dentures was mostly used by respondents with education-level college. The treatment option that is commonly used is the use of dentures, namely prostheses that replace part or all of the missing teeth and their supporting tissues. However, Oral Health-Related Quality of Life (OHRQoL) is an instrument that covers important aspects for dental patients.[17] Oral health is one of the aspects that is linked to and has a direct impact on quality of life.[18]

In this study we found a statistically significant correlation between OHRQoL and OIDP on the use of implants, conventional dentures, and non-users (without implant and conventional denture). In the physical health domain results, there were significant differences between implant and conventional denture variables, as well as implant and non-user (without implant and conventional denture) variables, while there was no significant difference between non-users (without implant and conventional denture) and conventional denture users. This was because patients with permanent prostheses including implant tended to have better oral hygiene compared to removable prosthesis. Implants are used by patients to create a more stable and retentive prosthesis, limiting food collection beneath the distal extension bases of the removable partial denture and reducing force on the elastic mucosa.[19] This is related to the inability of removable prosthesis patients to remove the prosthesis and clean the peri-implant area.[20,21] Physical health is the typical state of a healthy, well functioning organism.[22]

In the domain of psychological health, there were significant differences between all the variables, namely implant and conventional denture users, implant and non-users (without implant and conventional denture), and non-users (without implant and conventional denture) and conventional denture users. This was because psychological health improved significantly in patients with implants compared to conventional prostheses such as removable dentures.[23] A study also mentioned that the most common cause of emotional disturbances in a person was teeth loss as many as 36% of edentulous patients complained of emotional disturbances. The percentage decreased to 0% after implant treatment intervention.[24]

In the social relations domain, there were also significant differences between all the variables, namely implant and conventional denture users, implant and non-users (without implant and conventional denture), and non-users (without implant and conventional denture) and conventional denture users. The social dimension is related to the person's ability to communicate with others.[25] In the oral cavity, the tongue, soft palate, hard palate, dental alveolar complex, buccinator muscle, and lips are vital in controlling the shape and volume of the oral cavity during speech production.[26] One study also showed that implant therapy interventions removed interference with other people's contact and speech. As much as 44% and 38% people, respectively, experienced impaired communication with others and speech impairment due to teeth loss and 0% after implant treatment, respectively. Loss of teeth is also the leading cause of a person reluctant to smile and laugh. Implant therapy can eliminate these problems from 52% to 0%.[24]

In the environment domain, there were also significant differences between all the variables, namely implant and conventional denture users, implant and non-users (without implant and conventional denture), and non-users (without implant and conventional denture) and conventional denture users. This is because teeth loss is one of the main causes of work-related activity disorders. Environmental health has focused on the individual's ability to exercise and conduct visible daily activities.[25] The disturbance decreased drastically from 16% to 0% after the intervention of implant prosthesis therapy.[24] The decision to use an implanted prosthesis is influenced by several factors. Several factors can be associated with the use of implant prosthesis, including socioeconomic, education, and income level. The education level and socio-economic stability is positively associated with interest in oral health.[27]

In the OIDP domain, there were also significant differences between all the variables, namely implant and conventional denture users, implant and non-users (without implant and conventional denture), and non-users (without implant and conventional denture) and conventional denture users. This was because after denture therapy, there was an improvement in the quality of life in daily activities both in patients with implanted and conventional prostheses. Patients with implanted prostheses experienced an improvement in quality of life in all domains, particularly in terms of oral hygiene and self-satisfaction, compared to conventional prostheses. The most noticeable change is an increase in the

function of eating.[28] There was an improvement in quality of life and oral health in edentulous patients before and after implant therapy. Treatment of implants had a positive impact on quality of life related to oral health.[24]

Conclusion

We found statistically significant correlation between OHRQoL domains of physical health, psychological health, social relationships, and environment, and the domain of OIDP on the use of implants, conventional dentures, and non-users (without implant and conventional denture). Edentulism is really suffered by the people and has a negative effect meaningful to the physical, economic, and psychological. For this reason, determining the use of implants, conventional dentures, and non-users (without implant and conventional denture) is important to consider domains of OHRQoL consisting of physical health, psychological health, social relationships, environment, and the domain of OIDP.

Abbreviations

OHRQoL, Oral Health-Related Quality of Life; OIDP, Oral Impact on Daily Performance.

Data Sharing Statement

The general public does not have access to the data used in this study. They are available from the corresponding author upon reasonable request.

Ethics Approval and Informed Consent

After ethical authorization from the Health Research Ethics Committee of the Faculty of Dental Medicine, Universitas Airlangga, Surabaya, Indonesia, was released (Number: 441/HRECC.FODM/ VII/2022), a cross-sectional study was carried out. This study complies with the Declaration of Helsinki. In Surabaya, Indonesia, 102 partially edentulous patients aged 15 to 70 years were offered written consent and consent was obtained by the study participants prior to study commencement. All of the subjects understood and agreed to the terms of the study, and they provided written informed consent. Informed consent was obtained from the legal guardians for any minors under the age of consent included in the study prior to study commencement. Personal information from partially edentulous patients was gathered through surveys.

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Disclosure

The authors report no conflicts of interest in this work.

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