

Impact of Dental Restoration and Extraction Treatments on Oral Health–Related Quality of Life (OHRQoL)

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Received: 24 April 2025; Accepted: 02 May 2025; Available online: 10 October 2025

ABSTRACT

Background: Cavities or dental caries is one of the most common diseases as the main cause of pain in the oral cavity which can have a significant impact on quality of life. Cavities have several treatment modalities available such as restoration and tooth extraction. These treatment options not only affect the patient's clinical condition, but can also affect the psychological, social, and functional aspects reflected in the *Oral Health Related Quality of Life* (OHRQoL). The study aimed to determine the effect of restoration treatment and tooth extraction on *Oral Health Related Quality of Life* (OHRQoL).

Subjects and Method: This research was conducted in December 2024 with a total of 200 samples in Surakarta, This study uses a quantitative design with a *cross-sectional* approach. Data were collected from patients who had undergone restoration treatment and/or tooth extraction on cavities. Dependent variables are in the form of *Oral Health Related Quality of Life* (OHRQoL) and independent variables in the form of restorative treatments, tooth extraction, age and gender. Data were analyzed by double linear regression.

Results: Multiple linear regression analysis showed a significant negative association between the type of dental treatment and OHRQoL. Patients who underwent tooth extraction had OHRQoL scores that were 26.89 units lower than those who received restorative treatment ($b = -26.89$; 95% CI = -29.39 to -24.39; $p < 0.001$). No significant association was found between age or sex and OHRQoL.

Conclusion: Dental restoration treatments have a significant influence on improving *Oral Health Related Quality of Life* (OHRQoL), while tooth extraction shows a positive but insignificant relationship. Age and sex variables had no statistical effect on OHRQoL.

Keywords: Cavities, restoration, extraction, oral health, quality of life

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Cite this as:

Sulistyawati T, Novika RGH, Murti B, Cahyanto EB, Demartoto (2025). Dental Caries Treatment and Its Impact on Oral Health Quality of Life. *Indones J Med*. 10(04): 297-301. <https://doi.org/10.26911/theijmed.2025.843>.



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BACKGROUND

Dental and oral health are part of the body's health that cannot be separated from each other (Dewiyani and Puspitasari, 2021).

According to the results of the Basic Health Research (RISKESDAS) from 2013 to 2018, the percentage of the Indonesian population who have dental and oral problems

has increased from 25.9% to 45.3%. The highest proportion of dental and oral health problems is in the 15-24 year age group at 51.9%. This is reinforced by data from the results of the Basic Health Research (RISKESDAS) in 2018 which stated that the largest proportion of dental and oral health problems in Indonesia are damaged teeth, cavities, and accompanied by pain (45.3%). The prevalence of dental and oral health problems which is still high is due to the lack of public awareness in carrying out dental and oral care (Ossa, Sari and Fitri, 2024).

Cavities have several treatment modalities available such as tooth restoration and extraction. Dental restoration or filling is one way to repair tooth damage so that it can return to its original shape and function (Bhuva et al., 2021). Meanwhile, tooth extraction or extraction is the act of removing teeth and tooth roots from their sockets which involves bone and soft tissue in the oral cavity. Tooth extraction is the last option for dental treatment if the teeth can no longer be maintained (Dulanlebit and Hernani, 2023). Global dental and oral health problems cause a serious health burden, resulting in a significant decrease in quality of life (Budi et al., 2024).

Oral Health Related Quality of Life (OHRQoL) is a multidimensional concept related to the impact of oral health and disease that affects daily activities, well-being, or the overall quality of life of individuals. OHRQoL is used as a method to measure the quality of life of individuals related to oral health (Bennadi and Reddy, 2013). The components of the OHRQoL instrument include seven conceptual dimensions adapted from the international classification of disorders, disabilities consisting of functional limitations, physical pain, psychological discomfort, psychological disability, and social dis-

ability. A multidimensional view of oral health related quality of life (OHRQoL) provides important information for determining treatment needs and making clinical decisions and for evaluating interventions, services and programs in public health services (Ortíz-Barrios et al., 2019; Thirunavukkarasu et al., 2022). Research conducted by An et al (2022) reported that oral health related quality of life (OHRQoL) in Chinese adult patients was unsatisfactory. This is due to the lack of knowledge and healthy behavior patterns, especially those related to good oral hygiene habits. The more severe the tooth decay, the higher the impact on oral health related quality of life (OHRQoL). Based on this description, researchers are interested in analyzing the effect of restoration and tooth extraction treatments on cavities on oral health related quality of life (OHRQoL).

SUBJECTS METHOD

SUBJECTS AND METHODS

1. Study Design

This study is an analytical observational study with a cross-sectional approach method. Cross-sectional is a study conducted to obtain a picture of disease patterns and determinants in the target population by collecting data at a certain time (point time approach) (Wang and Cheng, 2020). This study analyzes the effect of restoration and extraction treatment on cavities on Oral Health Related Quality of Life (OHRQoL).

2. Population and Sample

The population in this study were patients with complaints of cavities who underwent restoration treatment and/or tooth extraction aged 18-24 years in Surakarta. The sampling method used was non-probability sampling. This method is considered appropriate for cross-sectional

research, samples were taken randomly from all subjects from the population that met the criteria so that subjects had an equal chance of being selected as samples from the study (Murti, 2023). In this study, the purposive sampling technique used a sample of 200 samples.

3. Variable

The dependent variable is Oral Health Related Quality of Life (OHRQoL) and the independent variables are restorative care, tooth extraction, age and gender.

4. Operational Definition of Variables

Oral Health Related Quality of Life (OHRQoL) is an overview of the perception of the relationship between oral health and quality of life.

Dental Restoration is a procedure to restore the anatomical structure and function of teeth that have been damaged due to psychological factors.

Tooth Extraction is the process of extracting or removing a tooth from its socket on the alveolar bone.

5. Research Instruments

Oral Health Related Quality of Life (OHRQoL) was measured using a modified OHIP-14 questionnaire and validity and reliability tests have been performed. Restoration and extraction of teeth were measured by filling out questionnaires regarding the treatment carried out on cavities. Measurement scales use continuous scales.

6. Data Analysis

Data analysis is in the form of univariate and multivariate analysis. Univariate analysis presents the characteristics of the sample data with frequency and percentage parameters. The univariate analysis in this study also presents the mean and standard deviation data of each construct. Multivariate analysis was performed to assess the

relationship between independent variables and related variables. Multiple linear regression analysis was performed to determine the simultaneous and partial influence of the type of dental care (restoration and extraction), respondent age, and gender on the quality of life related to *oral health or Oral Health Related Quality of Life (OHRQoL)*.

7. Research Ethics

This research has received Research Ethics approval from the Research Ethics Committee at Dr. Moewardi Hospital, Surakarta, Indonesia Faculty with ethics approval number 2.786/XII/HREC/2024.

RESULTS

1. Sample Characteristics

Table 1 shows the characteristics of the research subjects, in this study it was analyzed based on three main variables, namely gender, domicile, and age. Based on gender, out of a total of 200 respondents, 82 people (41%) were men, while 118 people (59%) were women. In terms of domicile, respondents came from five different sub-districts. The sub-district with the highest number of respondents is Serengan, which is 68 people (34%), followed by Laweyan District with 62 people (31%). Pasar Kliwon District had 40 respondents (20%), while Banjarsari District accounted for 17 respondents (8.5%), and Jebres District had the least number of respondents, namely 13 people (6.5%).

Table 1 also shows the characteristics of the research subjects based on age categories, respondents were grouped into two groups, namely ≤ 21 years old and ≥ 22 years old. A total of 91 people (45%) were aged 21 and under, while 109 people (55%) were aged 22 and over.

Table 1. Characteristics of Research Samples

Variable	Frequency (n)	Percentage (%)
Gender		
Male	82	41.00
Female	118	59.00
Domicile		
Banjarsari	17	8.50
Jebres	13	6.50
Laweyan	68	34.00
Pasar Kliwon	40	20.00
Serengan	62	31.00
Age		
≤ 21	91	45.00
≥ 22	109	55.00

2. Univariate Analysis

Univariate analysis is an approach to analyze one variable separately at a time. This method is the most basic and commonly used form of data analysis to describe the characteristics of a single

variable. The main objective of this analysis is to summarize and describe the distribution of variables, which makes it easier to understand the properties of these variables.

Table 2. Univariate Analysis Results

Variable	n	Mean	SD	Min.	Max.
Dental Restoration	200	3.93	2.13	0	8
Tooth Extraction	200	4.98	2.60	0	10
OHRQoL	200	64.87	15.94	21	89
Gender	200	0.59	0.49	0	1
Age	200	21.57	1.88	18	25

Table 2 shows the analysis of univariate data from the results of the study, the number of dental restorations performed on the respondents had an average value of 3.93 with a standard deviation of 2.13. In the tooth extraction variable, it was found that the average value of extraction treatment performed on the respondents was 4.98 with a standard deviation of 2.60. Oral health-related quality of life measured through OHRQoL showed an average score of 64.87 with a standard deviation of 15.94.

Table 2 also shows the analysis of univariate data with gender variables in this study measured in the form of binary data,

with a mean value of 0.59 and a standard deviation of 0.49. With a minimum value of 0 and a maximum of 1, this distribution shows that there is a fairly balanced proportion of male and female respondents, with slightly more female respondents than men. Analysis of the age variables, it was found that the average age of the respondents in this study was 21.57 years with a standard deviation of 1.88. The youngest recorded age is 18 years old, while the oldest age is 25 years old.

3. Multivariate Analysis

Multivariate analysis was performed to assess the relationship between the

independent variable of one and the related variable. Multiple linear regression analysis was performed to determine the simultaneous and partial influence of the type of

dental care (restoration and extraction), respondent age, and gender on the quality of life related to *oral health or Oral Health Related Quality of Life* (OHRQoL).

Table 3. Results of Double Linear Regression Analysis of the Effect of Dental Restoration Treatment, Tooth Extraction, Age and Gender on Oral Health Related Quality of Life

Variable	Regression Coefficient (b)	95% CI	p
Dental Caries Treatment (Extraction)	-26.89	-29.39 to -24.39	<0.001
Age (years)	-0.2	-0.85 to 0.45	0.538
Sex (Female)	-0.02	-2.53 to 2.47	0.982
N Observasi = 200			
Adjusted R-Squared = 69.33%			
p<0.001			

Table 3 presents the results of the multiple linear regression analysis examining the influence of dental caries treatment, age, and sex on OHRQoL. The analysis revealed a statistically significant negative association between tooth extraction and OHRQoL. Participants who underwent extraction had OHRQoL scores 26.89 points lower than those who received restorative treatment ($b = -26.89$; 95% CI = -29.39 to -24.39; $p < 0.001$).

DISCUSSION

1. Influence of Dental Caries Treatment on Oral Health–Related Quality of Life (OHRQoL)

The findings of this study demonstrate that the type of dental caries treatment has a significant impact on Oral Health–Related Quality of Life (OHRQoL). Specifically, patients who underwent tooth extraction had significantly lower OHRQoL scores compared with those who received restorative treatment. This suggests that although both extraction and restoration aim to manage caries-related pathology, their long-term

Age demonstrated a negative but statistically insignificant association with OHRQoL ($b = -0.20$; 95% CI = -0.85 to 0.45; $p = 0.538$). Similarly, sex had a negligible and non-significant effect on OHRQoL ($b = -0.02$; 95% CI = -2.53 to 2.47; $p = 0.982$).

The adjusted R-squared value of 69.33% indicates that the independent variables collectively explained 69.33% of the variance in OHRQoL. The overall model was statistically significant ($p < 0.001$). implications on functional, psychological, and social aspects of patients' daily lives differ substantially.

Dental restoration is inherently conservative and aims to preserve tooth structure and maintain oral function, aesthetics, and integrity of the dental arch. This therapeutic approach aligns with the principles of minimally invasive dentistry, which emphasizes preventive and restorative strategies to preserve natural dentition (Agrawal et al., 2021). In the present study, individuals who underwent restorative procedures reported better OHRQoL, which is

consistent with the assertion that retention of natural teeth supports masticatory efficiency, phonetics, and psychosocial confidence.

Conversely, tooth extraction, although clinically justified in cases of irreversible pulp pathology or severe structural destruction, is associated with negative long-term outcomes when not accompanied by prosthetic rehabilitation. In the short term, extraction may relieve acute symptoms such as pain and infection, leading to temporary improvements in comfort (Oktavi et al., 2018). However, consistent with previous literature, our findings indicate that tooth loss ultimately leads to functional limitations, altered facial structure, occlusal imbalance, and psychosocial distress (Jaber et al., 2021; Chatzopoulos et al., 2024). These consequences are reflected in the decline of OHRQoL scores post-extraction.

Longitudinal studies by Ortíz-Barrios et al. (2019) and An et al. (2022) emphasize that tooth extraction without subsequent prosthetic rehabilitation exacerbates oral functional disability and social discomfort. In contrast, patients who received timely prosthetic replacement, such as dentures or implants, demonstrated significant improvements in OHRQoL. These studies support the current findings by highlighting that clinical success should not be measured solely by symptom elimination, but also by the extent to which treatment preserves or restores quality of life. Therefore, extraction should not be considered a definitive treatment but rather a phase within a comprehensive treatment continuum that includes functional rehabilitation.

This evidence underscores the importance of integrating rehabilitative planning into dental care policies and clinical guidelines. Particularly in low-resource settings, economic constraints often limit access to prosthetic rehabilitation, leading to untreated tooth loss and reduced quality of life. Thus, public health strategies must not only focus on caries prevention and early restorative treatment but also ensure affordability and accessibility of post-extraction rehabilitation services.

2. Influence of Age on Oral Health–Related Quality of Life (OHRQoL)

The current study found no significant association between age and OHRQoL. While aging is commonly associated with declining oral health due to cumulative exposure to risk factors such as tooth wear, periodontal disease, and systemic conditions, age alone does not appear to be a determinant of perceived oral health burden. These findings are consistent with Gerritsen et al. (2019) and Ortíz-Barrios et al. (2019), who argue that behavioral and contextual factors—such as oral hygiene practices, dietary habits, socioeconomic status, and access to dental care—moderate the relationship between age and OHRQoL.

Interestingly, some studies have reported that older adults who maintain functional dentition and adhere to regular dental check-ups report OHRQoL levels comparable to younger populations (Shahzad and Majeed, 2020). This challenges the stereotype that aging intrinsically leads to poor oral health outcomes. Instead, it reflects a shift in perspective: OHRQoL represents a subjective evaluation influenced not only by clinical indicators but also by personal

adaptation, coping mechanisms, and satisfaction with oral function. In this study, good OHRQoL among young adults may also reflect lower cumulative oral disease burden compared to older age groups, but findings also suggest that age within the narrow adult range of 18–25 years does not constitute a major differentiating factor.

4. Influence of Sex on Oral Health–Related Quality of Life (OHRQoL)

This study also found no statistically significant relationship between sex and OHRQoL. Although previous research has indicated sex-related differences in health perception and care-seeking behavior, these differences did not translate into significant variation in OHRQoL scores among participants. Women generally report greater health awareness and tend to seek preventive dental care more frequently than men (Zucoloto, Maroco, and Campos, 2016; Kavaliauskienė et al., 2020). However, they may also exhibit higher sensitivity to pain and esthetic concerns, potentially lowering their perceived oral well-being despite adequate clinical conditions.

In contrast, men are often less engaged in maintaining dental hygiene or seeking routine dental care, yet tend to underreport discomfort or functional limitations, resulting in more favorable self-assessment of OHRQoL (Thirunavukkarasu et al., 2022). The lack of significant association found in this study is consistent with Agrawal et al. (2021) and Rajeh (2022), who emphasize that psychosocial and behavioral factors mediate the relationship between sex and OHRQoL, reducing the direct influence of sex alone.

These findings suggest that OHRQoL is shaped by complex interactions between psychological attitudes, oral health behaviors, social roles, and cultural expectations rather than biological sex differences. Dental health promotion programs should therefore account for gender-specific behavioral patterns rather than assuming inherent sex differences in oral health outcomes.

AUTHORS CONTRIBUTIONS

Tri Sulistyawati, the principal investigator, played a key role in selecting the research topic, designing the methodology, collecting field data, conducting test, and compiling the research findings. Revi G. H. Novika, contributed to the writing process by reviewing the accuracy of the research approach, and methodology. Bhisma Murti contributed to the development of the conceptual framework, guided the data analysis process, and assisted in interpreting the analytical results. Argyo Dermatoto and Erindra B Cahyono provided valuable input in drafting the journal.

FINANCIAL SUPPORT AND SPONSORSHIP

This study is self-funded.

ACKNOWLEDGEMENT

The researcher would like to thank all parties who have contributed to the preparation of this article.

CONFLICT OF INTEREST

The authors declare no conflicts of interest related to this study.

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