

## Relationship between Chronic Pain Severity and Quality of Life in TMD Patients

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### Abstract

Pain can affect the individual's quality of life. Temporomandibular disorders (TMD) are the most common type of chronic orofacial pain. Most TMD patients seek treatment as their pain starts affecting their daily activities. This study examined the association between chronic pain severity and quality of life of TMD patients using the GCPS-Indonesian version and OHIP-TMD assessment tools (GCPS-ID and OHIP-TMD-ID). The relationship between sociodemographic factors and quality of life was also assessed. A total of 202 subjects were given three questionnaires (ID-TMD, GCPS-ID, and OHIP-TMD-ID) to fill. Data were collected and analyzed using the Kruskal-Wallis test. Subjects who scored having more severe chronic pain had higher OHIP-TMD-ID scores and consequently a lower quality of life. The relationship between chronic pain severity and quality of life was significant ( $p < 0.05$ ) and corroborated the results of other studies. The quality of life did not significantly differ by age, gender, educational level, and employment status ( $p > 0.05$ ). However, the quality of life was significantly influenced by marital status ( $p < 0.05$ ). Chronic pain severity associated with TMD lowers the quality of life of patients.

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### Introduction

The International Association for the Study of Pain defines pain as an unpleasant sensory and emotional experience associated with actual or potential tissue damage, or described in terms of such damage.<sup>1</sup> In general, pain is divided into acute and chronic. Acute pain usually has an obvious cause with temporary quality and responds well to simple treatment. Meanwhile, chronic pain is a complex state influenced by many factors, needing multidisciplinary management.<sup>2</sup>

One of the most common types of chronic pain found in the orofacial region is temporomandibular disorder (TMDs), which affects 5–12% of the population.<sup>3</sup> TMD is a term used to include all functional disturbances of the masticatory system, such as masticatory muscles and/or structures surrounding the temporomandibular joint.<sup>4</sup>

Most TMD patients visit clinics with pain as their chief complaint. Therefore, it is important to evaluate pain based on its location, onset, and characteristics; factors that aggravate and alleviate it; prior history of treatment; and others pain-related complaints.<sup>4</sup> The severity of pain conditions can be described from two subjective complaints, the intensity of pain and limitations in activity. The instrument used to measure chronic orofacial pain is the Graded Chronic Pain Scale (GCPS). The GCPS consists of eight questions that assess the persistence of pain, pain intensity, and disability due to pain and disruption to daily activities. Level limitations are associated with chronic pain and a poor treatment outcome.<sup>5-7</sup>

TMD patients have a physical condition with diverse psychosocial disorders that result from chronic orofacial pain. This disorder significantly affects patients as severe pain in the orofacial region, neck and head, sleep disturbances and depression. In addition, the functional activities that require optimal jaw mobility, such as eating, chewing, biting, and speech, became impaired.<sup>8-10</sup> This condition can affect the patient's quality of life and functional status.

Oral Health-Related Quality of Life (OHRQoL) is a multidimensional construct that

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includes a subjective evaluation of the individual's oral health, functional well-being, expectations, and satisfaction with care and sense of self.<sup>11,12</sup> The Oral Health Impact Profile (OHIP) is commonly used to evaluate the OHRQoL.<sup>13</sup> Instrument development in the area of oral health-related quality of life (OHRQoL) initially focused on adult and geriatric populations.<sup>14</sup> OHIP is a questionnaire that was developed to provide a comprehensive measure of self-reported dysfunction, discomfort, and disability attributed to oral condition. The aim of this questionnaire is to capture the impacts related to the oral condition in general, so it is less appropriate when applied to specific oral disorders such as TMDs. Therefore, Durham et al developed the OHIP-TMD, which is a more concise, specific, and sensitive instrument to evaluate the negative impacts specifically related to TMD so that the results can be used to determine the effects of treatment over time.<sup>12,15</sup>

This study aimed to analyze the relationship between the severity of chronic pain and the quality of life in patients with TMD-based questionnaires, GCPS version 2.0 and OHIP-TMD, which have been validated for the Indonesian population. Furthermore, we evaluated the relationship between sociodemographic factors and the quality of life in patients with TMD.

### Materials and methods

This cross-sectional study was approved by the Ethics Committee of Universitas Indonesia (UI), and conducted at the UI Dental Teaching Hospital. A total of 202 subjects participated in this study and signed written informed consent forms. Subjects aged >17 years who presented with some of the following signs or symptoms were included in the study: pain in the temporomandibular joint or the masticatory muscle, and parafunctional behavior. Exclusion criteria included the inability to communicate and refusal to sign informed consent forms.

Clinical histories were taken for all subjects, and the three questionnaires (ID-TMD, GCPS-ID, and OHIP-TMD-ID) were filled out by the subjects. The ID-TMD questionnaire consists of eight questions, each with a four-scale rating. The total value ranges from 0–24 with a cutoff point of 3; thus, when the total value indicates a value of more than 3, the subject is considered to

have TMDs. The GCPS-ID and OHIP-TMD-ID questionnaires were validated before this study was conducted, and both questionnaires were found to be valid and reliable for the Indonesian population. The GCPS-ID consists of eight questions that integrate the intensity of pain with disability using the visual analog pain scales (0–10), which address the inability to work and social relationships. The degrees of chronic pain severity are classified from grades 0–4 (0, no pain; 1, low pain intensity (<15) and disability score <17; 2, high intensity (>15) and disability score <17; 3, moderate disorders and disability score range 17–24; 4, severe impairment, disability score range, 25–40). OHIP-TMD-ID questionnaires contain 22 questions each with a five-scale rating. The total value is used to indicate quality of life-related oral health of subjects. From the data, we conducted a descriptive analysis of the sociodemographic and clinical variables. The bivariate relationship between the quality of life in patients with TMD and the severity of chronic pain, age, gender, educational level, employment status, and marital status was determined.

### Results

All subjects answered the entire questionnaire. The subjects ranged from 17–65 years of age, with the majority in the 17–25 years range (78.7%). Among all the subjects, 16.8% were male and 83.2% were female. Of these, 124 subjects (61.4%) had grade 1 chronic pain, and 1 subject (1%) experienced the most severe chronic pain. However, only 3 subjects (1.5%) subjectively stated that they have a poor quality of life, whereas 149 (73.8%) claimed to have a good quality of life, and 50 (24.8%) had a moderate quality of life. Table 1 shows a description.

Table 2 presents the frequency distribution of TMD patient complaints. Sixty-nine subjects (34.2%) complained of frequent headaches, and nine subjects (4.5%) complained of pain when opening and closing the mouth.

Data obtained from the GCPS-ID and OHIP-TMD-ID showed abnormal data distribution, so the Kruskal-Wallis test was carried out to analyze the relationship between the severity of chronic pain and the quality of life in patients with TMD. The results indicated a statistically significant difference in the quality of life scores

between patients with different severities of chronic pain ( $p = 0.0000$ ). Furthermore, the post-hoc Mann-Whitney test was carried out between each grade, and the results revealed statistically significant differences between grades 0 and 1, 0 and 2, 0 and 3, and 1 and 2 ( $p < 0.05$ ). There is no difference in the quality of life between the other grades (Table 3).

Then, we analyzed the relationship between the quality of life and the age, gender, education level, employment status and marital status. The normality test results indicated abnormal data distribution. The Kruskal-Wallis test was used to analyze the relationship between the quality of life and age, and the  $p$  value was found to be 0.415, indicating that the quality of life did not significantly differ between the different age groups (Table 4).

The Mann-Whitney test (Table 5) was used to analyze the relationship between quality of life and gender, educational level, employment status, and marital status. The results revealed no significant differences in quality of life between different gender, educational level, and employment status groups ( $p > 0.05$ ). Thus, the quality of life did not significantly differ between men and women, those who completed high school or higher education, and professional and non-professional subjects. However, there was a significant difference in the quality of life scores between different marital status groups ( $p < 0.05$ ).

|                            |                            | Frequency | Percentage |
|----------------------------|----------------------------|-----------|------------|
| Age (years)                | 17–25                      | 159       | 78.7       |
|                            | 26–45                      | 39        | 19.3       |
|                            | 46–65                      | 4         | 2.0        |
|                            | Total                      | 202       | 100        |
|                            | Gender                     | Male      | 34         |
| Female                     |                            | 168       | 83.2       |
| Total                      |                            | 202       | 100        |
| Level of education         | Graduated from high School | 130       | 64.4       |
|                            | Graduated higher education | 72        | 35.6       |
|                            | Total                      | 202       | 100        |
| Work                       | Professional               | 42        | 20.8       |
|                            | Non-professional           | 160       | 79.2       |
|                            | Total                      | 202       | 100        |
| Marital status             | Not married                | 177       | 87.6       |
|                            | Married                    | 25        | 12.4       |
|                            | Total                      | 202       | 100        |
| Severity of chronic pain   | 0                          | 52        | 25.7       |
|                            | 1                          | 124       | 61.4       |
|                            | 2                          | 16        | 7.9        |
|                            | 3                          | 9         | 4.5        |
|                            | 4                          | 1         | 0.5        |
|                            | Total                      | 202       | 100        |
| Subjective quality of life | Good                       | 149       | 73.8       |
|                            | Moderate                   | 50        | 24.8       |
|                            | Poor                       | 3         | 1.5        |
|                            | Total                      | 202       | 100        |

**Table 1.** Distribution of subjects based on sociodemographic characters, severity of chronic pain, and quality of life.

|        | Jaw pain |      | Head pain |      | Pain when opening/closing the mouth |      | Neck pain |      |
|--------|----------|------|-----------|------|-------------------------------------|------|-----------|------|
|        | F        | %    | F         | %    | F                                   | %    | F         | %    |
| Never  | 39       | 19.3 | 19        | 9.4  | 72                                  | 35.6 | 74        | 36.6 |
| Rarely | 116      | 57.4 | 111       | 55.0 | 92                                  | 45.5 | 88        | 43.6 |
| Often  | 45       | 22.3 | 69        | 34.2 | 29                                  | 14.4 | 35        | 17.3 |
| Always | 2        | 1.0  | 3         | 1.5  | 9                                   | 4.5  | 5         | 2.5  |
| Total  | 202      | 100  | 202       | 100  | 202                                 | 100  | 202       | 100  |

  

|        | Ear buzzing |      | Clenching or grinding of the jaw |      | Full concentration |      |
|--------|-------------|------|----------------------------------|------|--------------------|------|
|        | F           | %    | F                                | %    | F                  | %    |
| Never  | 60          | 29.7 | 110                              | 54.5 | 71                 | 35.1 |
| Rarely | 108         | 53.5 | 57                               | 28.2 | 72                 | 35.6 |
| Often  | 33          | 16.3 | 31                               | 15.3 | 53                 | 26.2 |
| Always | 1           | 0.5  | 4                                | 2.0  | 6                  | 3.0  |
| Total  | 202         | 100  | 202                              | 100  | 202                | 100  |

**Table 2.** Description of TMD patients

|                          | N       | OHIP total | p value    |
|--------------------------|---------|------------|------------|
| Severity of chronic pain | Grade 0 | 52         | 11 (0–53)  |
|                          | Grade 1 | 124        | 23 (0–60)  |
|                          | Grade 2 | 16         | 42 (6–67)  |
|                          | Grade 3 | 9          | 32 (14–75) |
|                          | Grade 4 | 1          | 75 (75–75) |

**Table 3.** Difference between the severity of chronic pain among groups. Kruskal-Wallis test.

|     | N           | OHIP total | p value    |
|-----|-------------|------------|------------|
| Age | 17–25 years | 159        | 20 (0–75)  |
|     | 26–45 years | 39         | 25 (0–75)  |
|     | 46–65 years | 4          | 35 (12–48) |

**Table 4.** Relationship between age and quality of life. Kruskal-Wallis test.

|                                      | Median (minimum–maximum)                 | p value     |
|--------------------------------------|--|-------------|
| OHIP-TMDS Total                      | Male (n = 34)                            | 19 (0–75)   |
|                                      | Female (n = 168)                         | 20.5 (0–75) |
| Graduated from high school (n = 130) |  | 20 (0–75)   |
|                                      | Graduated from higher education (n = 72) | 25 (0–75)   |
| Professionals (n = 42)               |  | 26 (0–75)   |
|                                      | Non-Professionals (n = 160)              | 20 (0–67)   |
| Not married (n = 177)                |  | 20 (0–75)   |
|                                      | Married (n = 28)                         | 28 (8–67)   |

**Table 5.** Relationship between quality of life and gender, educational level, employment status and marital status. Mann-Whitney test.

## Discussion

Several studies have found a significant relationship between the severity of chronic pain and the quality of life, similar to the results of the present study. Miettinen et al. reported a significant correlation between the OHIP and GCPS scores, where increased severity of chronic pain was associated with poor quality of life.<sup>16</sup> John et al. also stated that OHRQoL had a strong relationship with the severity of chronic pain.<sup>17</sup> Reissmann et al. reported that subjects who felt pain generated higher OHIP scores than subjects who did not experience pain.<sup>18</sup> All of those studies have the same findings as our study.

This study showed that 61.4% of subjects had chronic pain grade 1; this result was supported by Manfredini et al., which reported that among patients with grade 1 (35%) and level 2 (40%) TMD chronic pain, only a small proportion of patients with TMD experienced prolonged pain that negatively affected daily activities, and only 5.4% of patients reported being troubled by the presence of pain.<sup>19</sup> The differences in the quality of life may have occurred because patients with grade 0 pain do not experience any pain, while patients with levels 1 and 2 pain are already experiencing pain at different qualities, which affects the OHIP-TMD score. The difference in the quality of life score between grades 0 and 3 chronic pain severity was large as subjects with grade 3 pain had high disability resulting in the inability to function normally, further reducing the quality of life of these patients.<sup>16,19</sup>

Quality of life is an individual's perception of their lives, within the scope of the prevalent culture and social values, and is related to the goals, expectations, standards, and priorities in life.<sup>20</sup> The quality of life is influenced by sociodemographic characteristics, where the quality of life was affected in women, the elderly, individuals with a low educational level, and those with a low economic level. However, some studies stated that age and gender had no significant relationship with the quality of life.<sup>21-23</sup> Our results are in line with the results of the previous studies. There was a significant difference in the quality of life among individuals with different marital status. This is in line with the research conducted by Sores and Peto in

Hungary, who reported that 74.11% of respondents said that family contributed positively to their quality of life. However, the same study showed that an unmarried individual had higher levels of satisfaction with respect to quality of life. It is further described that choosing to not marry and the desire to maintain one's personal freedom are new trends.<sup>22</sup>

## Conclusion

The higher severity of chronic pain as assessed by GCPS-ID, the lower was the quality of life in subjects with TMD as assessed by OHIP-TMDs-ID. The quality of life of subjects with TMD was not associated with age, gender, level of education, and employment, but it was related to marital status.

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## Declaration of Interest

The authors report no conflict of interest.

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