Self-Reported Symptoms of Temporomandibular Disorders: Relationship with Psychologic Well-Being, Psychologic Distress, and Oral Health–Related Quality of Life

by Caroline Damayanti Marpaung

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Self-Reported Symptoms of Temporomandibular Disorders: Relationship with Psychologic Well-Being, Psychologic Distress, and Oral Health–Related Quality of Life

Adrian Ujin Yap, BDS, MSc, PhD, Grad Dip Psychotherapy
Department of Prosthodontics, Faculty of Dentistry, Trisakti University, Jakarta, Indonesia; Department of Dentistry, Ng Teng Fong General Hospital and Faculty of Dentistry, National University Health System, Singapore; National Dental Research Institute Singapore, National Dental Centre and Duke-NUS Medical School, Singapore Health Services, Singapore.

Carolina Marpaung, BDS, MDS, PhD
Department of Prosthodontics, Faculty of Dentistry, Trisakti University, Jakarta, Indonesia.

Enrita Dian Rahmadini, BDS, MDS
Department of Pediatric Dentistry, Faculty of Dentistry, Trisakti University, Jakarta, Indonesia.

Purpose: To investigate the relationships of self-reported temporomandibular disorder (TMD) symptoms with psychologic well-being (PWB), psychologic distress (PD), and oral health–related quality of life (OHRQoL). ***Materials and Methods:*** The study sample was recruited from a local university using a convenience sampling technique. The Diagnostic Criteria for TMD Symptom Questionnaire (DC/TMD-SQ); Scales of Psychological Well-Being-18 (SPWB-18); Depression, Anxiety, and Stress Scale-21 (DASS-21); and Oral Health Impact Profile-14 (OHIP-14) were administered electronically to establish TMD symptoms and to assess PWB, PD, and OHRQoL, respectively. Data were analyzed by number/type of TMD symptoms using Kruskal-Wallis/Mann-Whitney *U* tests and Spearman correlation ($\alpha = .05$). ***Results:*** A total of 602 participants with a mean age of 19.30 ± 1.18 years (84.3% women) were evaluated. Of these, 59.2% reported TMD symptoms, with 10.7% having multiple (≥ 3) features. Pain-related (PT), intra-articular (IT), and combined (CT) TMD symptoms were present in 23.8%, 15.4%, and 20.2% of the cohort, respectively. For both number and type of symptoms, significant differences in SPWB-18 (total/environmental mastery and self-acceptance domains), DASS-21 (total/all domains), and OHIP-14 (total/all domains) scores were observed ($P < .05$). A moderately strong negative correlation was noted between PWB and PD ($r_s = -0.55$). ***Conclusion:*** Participants with no TMD symptoms had significantly higher PWB than those with two or more TMD symptoms. They also had significantly lower levels of PD and better OHRQoL. Conversely, individuals with PT/CT reported significantly lower PWB compared to those with no symptoms. Moreover, they also had significantly higher levels of PD and poorer OHRQoL than the IT/no symptoms groups. *Int J Prosthodont 2022;35:45–52. doi: 10.11607/ijp.7580*

Temporomandibular disorders (TMDs) are a cluster of medical and dental conditions affecting the temporomandibular joints (TMJs), masticatory muscles, and related structures. Features of TMDs include TMJ/muscle pain, headaches, and TMJ sounds during jaw movement, as well as functional difficulties. They are the most pervasive orofacial pain condition, affecting about 7% of adolescents and 15% of adults.[1] Women appear to be at greater risk for TMDs, especially those from 20 to 40 years of age.[2] The multifactorial etiology of TMDs has been confirmed to be consistent with the biopsychosocial model of illness.[3] Prior studies have largely focused on TMDs and psychologic distress (PD), notably depression, which has been associated with chronic musculoskeletal pain.[4,5] Moderate to severe levels of depression were observed in 21.4% to 60.1% of TMD patients.[5] Moreover, TMDs have been linked to poorer oral health–related quality of life (OHRQoL) through depression.[6] Despite the plethora of literature on PD and OHRQoL, there is a paucity of TMD research relating to psychologic well-being (PWB). PWB has been explored in other chronic

Correspondence to:
Dr Carolina Marpaung
Department of Prosthodontics
Faculty of Dentistry,
Trisakti University
Jl Kyai Tapa no 260,
Jakarta 1140, Indonesia
Email: carolina@trisakti.ac.id

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diseases, such as rheumatoid arthritis, fibromyalgia, and chronic fatigue syndrome.[7–9] Such studies are clinically relevant, considering the health-protective attributes of high PWB.[10,11]

PWB is more than the absence of disease and/or PD. It is a complex construct concerning optimal experience and functioning.[12] PWB has been conceptualized based on two broad theories. The hedonic model defines well-being in relation to "pleasure attainment and pain avoidance" and centers on happiness. Conversely, the eudaimonic model explains well-being in terms of "meaning and self-realization" and focuses on positive functioning.[12–14] Ryff's operationalized measure of eudaimonic well-being, or Scales of Psychological Well-Being (SPWB), encompasses six dimensions of positive functioning: *(1)* autonomy; (*2)* environmental mastery; *(3)* personal growth; *(4)* positive relations with others; *(5)* purpose in life; and (6) self-acceptance.[14,15] The SPWB has been validated and widely used in research across multiple disciplines.[10,16,17] Based on the SPWB, higher PWB was linked to lower disability and fatigue, but not to pain, in patients with fibromyalgia.[8] Furthermore, well-being domains were found to be independent of physical symptoms but strongly related to the psychologic components of fatigue and PD in patients with chronic fatigue syndrome.[9] Until now, no studies have delved into the associations between TMD symptomology based on the contemporary Diagnostic Criteria for TMDs (DC/TMD) standard[18] and PWB, PD, and OHRQoL.

Therefore, the objectives of this study were to examine the self-reported symptoms of TMDs in terms of number and type and their relationships to PWB, PD, and OHRQoL. In addition, the correlations between PWB, PD, and OHRQoL were also established. The null hypotheses were: *(1)* the number and type of TMD symptoms have no bearing on PWB, depression, anxiety, stress, or OHRQoL; and *(2)* PWB, PD, and OHRQoL are not correlated.

MATERIALS AND METHODS

Approval was attained from the ethics committee of the Trisakti University School of Dentistry, Indonesia (reference no.: 244/S3/KEPK/FKG/2/2019) before commencing the research. The study sample was recruited from a local university in Jakarta using a convenience sampling method. With G*Power Software (version 3.1.9.3),[19] a minimum sample size of N = 286 was established a priori, founded on the Wilcoxon-Mann-Whitney model with an effect size of 0.50, alpha error of 0.05, power of 95%, and allocation ratio of 4, based on earlier work.[20] Volunteers aged between 18 and 22 years who were in good general health with no physical impairments or debilitating illness were included in the study. Those with a history of traumatic injuries, psychiatric treatment, or uncontrolled metabolic, autoimmune, or other systemic conditions were excluded. The study participants were provided information on the study, and informed consent was obtained before administering the survey via Google Forms. The electronic survey was conducted over 2 months and comprised demographic parameters, the DC/TMD Symptom Questionnaire (SQ), the SPWB-18, the Depression, Anxiety, and Stress Scale-21 (DASS-21), and the Oral Health Impact Profile-14 (OHIP-14).[21–24]

The SQ (https://ubwp.buffalo.edu/rdc-tmdinternational/) is necessary for generating DC/TMD Axis I (physical) diagnoses and includes 14 items about TMD pain, headaches, TMJ sounds, and closed and open locking. According to the DC/TMD, common TMD conditions can be classified into pain-related and intra-articular TMDs. Positive responses to the primary questions on pain and/or headaches accompanying TMDs were used to identify the presence of pain-related TMD symptoms. Likewise, positive responses to the key questions on jaw joint noises and closed and open locking of the jaws were utilized to specify the presence of intra-articular TMD symptoms. The participants were subsequently categorized into the following groups:

- Number of TMD symptoms: no TMD symptoms (NT); one TMD symptom (OS); two TMD symptoms (TS); and multiple (ie, three or more) TMD symptoms (MS)
- Type of TMD symptoms: no TMD symptoms (NT); pain-related TMD symptoms (PT); intra-articular TMD symptoms (IT); and combined (ie, both PT and IT) TMD symptoms (CT)

The SPWB-18 (https://sparqtools.org/mobility-measure/psychological-wellbeing-scale/) was used to evaluate PWB and comprises 18 items, with 3 questions for each of the 6 subscales of positive functioning. The responses are scored on a 7-point scale, with 1 = strongly agree and 7 = strongly disagree, and some questions are coded in reverse. The domain scores are calculated and totaled to derive the total SPWB score, and higher levels of PWB are indicated by greater total and domain scores.

PD was examined using the DASS-21 (http://www2.psy.unsw.edu.au/dass//), which involves 21 items. Seven questions are dedicated to each emotional state; ie, depression, anxiety, and stress. Responses are scored on a 4-point scale, ranging from 0 = did not apply to me at all to 3 = applied to me very much, or most of the time. Scores for each emotional state are calculated and summed to obtain the total DASS score. Greater scores indicate higher levels of psychologic and emotional distress. The OHIP-14 was utilized to determine OHRQoL and contains 14 items with 2 questions for each of the 7 domains: functional limitation, physical pain, psychologic discomfort, psychologic disability, physical disability,

Table 1 Gender Distribution of the Various Groups (N = 605)

Variables		Total n (%)	Women n (%)	Men n (%)
Number of symptoms	None	247 (40.8)	206 (83.4)	41 (16.6)
	One	186 (30.7)	153 (82.3)	33 (17.7)
	Two	107 (17.7)	91 (85.0)	16 (15.0)
	Three or more	65 (10.7)	60 (92.3)	5 (7.7)
Type of symptoms	None	247 (40.8)	206 (83.4)	41 (16.6)
	Pain-related	143 (23.8)	126 (88.1)	17 (11.9)
	Intra-articular	93 (15.4)	67 (72.0)	26 (28.0)
	Combined	122 (20.2)	111 (91.0)	11 (9.0)

All data are reported as n (%).

social disability, and handicap. The questions are scored on a 5-point response scale, with 0 = never to 4 = very often. Domain scores are tallied to derive the total OHIP score. Larger total and domain OHIP-14 scores denote greater impairments to quality of life.

Statistical Analyses

Statistical analyses were conducted with the IBM SPSS Statistics for Windows software version 24.0 (IBM) with the significance level set at .05. As the SPWB-18, DASS-21, and OHIP-14 data were not normally distributed based on Kolmogorov-Smirnov test, nonparametric analyses were conducted with Kruskal-Wallis and Mann-Whitney *U* tests. Total and domain scores were compared by number and type of TMD symptoms. Interrelationships between the number of TMD symptoms and the SPWB-18, DASS-21, and OHIP-14 scores were performed using Spearman rank-order correlation. Correlation strengths were deemed weak (correlation coefficient [r_s] = 0.1 to 0.3), moderate (r_s = 0.4 to 0.6), or strong (r_s = 0.7 to 0.9) based on the classification by Dancey and Reidy.[25]

RESULTS

Out of 733 individuals who were approached, 39 met the exclusion criteria, and 89 declined participation (response rate of 87.2%). The mean age of the study cohort (N = 605) was 19.30 ± 1.18 years, and the cohort was comprised of 84.3% women and 15.7% men. The prevalence of TMD symptoms by number and type were as follows (Table 1):

- Number: NT = 40.8%; OS = 30.7%; TS = 17.7%; MS = 10.7%
- Type: NT = 40.8%; PT = 23.8%; IT = 15.4%; CT = 20.2%

For all TMD symptom groups, a greater frequency of women was perceived compared to men.

The mean and median SPWB-18, DASS-21, and OHIP-14 scores by number and type of TMD symptoms are displayed in Tables 2 and 3 with the results of the statistical analyses. For the number of TMD symptoms, significant differences in total SPW and the domains environmental mastery, positive relations with others, and self-acceptance were observed between the various groups. Likewise, significant differences in DASS-21 (total/all domains) and OHIP-14 (total/all domains) were noted. NT participants had significantly higher total SPWB scores than TS and MS participants and showed significantly lower total DASS and depression, anxiety, and stress domain scores, as well as total OHIP scores, when evaluated against their counterparts with TMD symptoms (ie, the OS, TS, and MS groups). For types of TMD symptoms, significant differences in SPWB-18 (total/environmental mastery and self-acceptance domains), DASS-21 (total/all domains), and OHIP-14 (total/all domains) were detected. Individuals with PT and CT symptoms reported significantly lower total SPWB scores compared to those with no symptoms. Moreover, they generally had significantly higher total DASS, depression, anxiety, and stress domain scores, as well as total OHIP scores, than the IT and NT groups.

Table 4 shows the correlations between the number of TMD symptoms, total SPWB, DASS, and OHIP scores. Correlation coefficients (r_s) ranged from −0.55 to 0.47. A moderately strong negative correlation was observed between total SPWB and total DASS, while a moderately strong positive association was determined between total OHIP and total DASS. Correlations between the number of TMD symptoms and total SPWB, DASS, and OHIP were weak, as was the association between total SPWB and total OHIP.

DISCUSSION

This study established the relationship of self-reported TMD symptoms with PWB, PD, and OHRQoL and determined the correlations between these variables. As the

Table 2 Mean (SD) and Median (Interquartile Range) Total and Domain SPWB-18, DASS-21, and OHIP-14 Scores Based on Number of TMD Symptoms

Variables		No symptoms (NT)	One symptom (OS)	Two symptoms (TS)	Three or more symptoms (MS)	*P*	Post hoc significant comparisons
SPWB-18							
Total	Mean Median	91.85 (10.68) 93 (85–99)	89.73 (10.32) 91 (84–96)	88.43 (10.86) 90 (81–96)	87.78 (12.15) 90 (80.5–95)	.005	NT > TS, MS
Autonomy	Mean Median	13.46 (2.73) 13 (12–15)	13.34 (2.73) 13 (12–15)	13.04 (2.57) 13 (11–15)	13.71 (3.05) 14 (12–16)	.346	–
Environmental mastery	Mean Median	14.68 (2.63) 15 (13–17)	13.66 (2.66) 14 (12–16)	13.77 (2.96) 14 (12–16)	13.78 (2.58) 14 (12–16)	< .001	NT > OT
Personal growth	Mean Median	17.96 (2.25) 18 (17–20)	17.95 (2.20) 18 (17–19)	17.82 (2.36) 18 (16–20)	17.14 (2.50) 18 (16–19)	.100	–
Positive relations with others	Mean Median	14.80 (2.95) 15 (13–17)	14.50 (2.77) 14 (13–17)	13.87 (3.25) 14 (12–16)	14.17 (3.53) 14 (11–17)	.043	NT > TS
Purpose in life	Mean Median	15.30 (2.68) 16 (14–17)	15.46 (2.61) 16 (14–18)	15.23 (2.50) 15 (14–17)	14.91 (2.78) 15 (13–17)	.514	–
Self-acceptance	Mean Median	15.64 (2.86) 16 (14–18)	14.38 (3.05) 15 (13–17)	14.70 (3.25) 15 (13–17)	14.08 (3.10) 15 (12–16)	< .001	NT > OS, TS, MS
DASS-21							
Total	Mean Median	14.98 (8.57) 15 (9–20)	18.68 (8.52) 19 (13–24)	22.03 (11.02) 21 (14–29)	22.60 (10.84) 21 (15–31)	< .001	MS, TS, OS > NT
Depression	Mean Median	3.65 (3.16) 3 (1–5)	4.45 (3.05) 4 (2–6)	5.44 (3.92) 4 (3–8)	5.50 (3.79) 5 (3–7)	< .001	MS, TS, OS > NT
Anxiety	Mean Median	5.00 (3.07) 7 (3–7)	6.62 (3.35) 7 (4–9)	7.70 (3.78) 7 (5–11)	7.86 (3.92) 6 (5–11)	< .001	MS, TS, OS > NT
Stress	Mean Median	6.33 (3.59) 6 (4–9)	7.60 (3.63) 7 (5–10)	8.89 (4.54) 8 (5–11)	9.23 (4.46) 9 (6–12)	< .001	MS, TS, OS > NT
OHIP-14							
Total	Mean Median	7.20 (7.56) 5 (1–10)	9.18 (7.76) 7 (3–14)	11.60 (8.23) 11 (5–17)	15.31 (10.24) 13 (7.5–22)	< .001	MS, TS, OS > NT MS > OS
Functional limitation	Mean Median	0.66 (1.14) 0 (0–1)	0.89 (1.28) 0 (0–2)	0.79 (1.16) 0 (0–1)	1.14 (1.43) 1 (0–2)	.019	MS > NT
Physical pain	Mean Median	1.60 (1.50) 2 (0–2)	1.92 (2.00) 2 (1–3)	2.22 (1.61) 2 (1–3)	3.23 (2.04) 3 (2–5)	< .001	MS, TS > NT MS > TS, OS
Psychologic discomfort	Mean Median	1.34 (1.61) 1 (0–2)	1.75 (1.92) 1 (0–3)	2.30 (1.95) 2 (1–4)	2.91 (2.07) 2.1 (1–4)	< .001	MS, TS > OS, NT
Physical disability	Mean Median	1.11 (1.44) 1 (0–2)	1.52 (1.52) 1 (0–2)	2.00 (1.74) 2 (0–3)	2.49 (2.11) 2 (1–4)	< .001	MS, TS, OS > NT MS > OS
Psychologic disability	Mean Median	1.06 (1.42) 0 (0–2)	1.35 (1.60) 1 (0–2)	2.06 (1.86) 2 (0–4)	2.46 (1.90) 2 (1–3)	< .001	MS, TS > OS, NT
Social disability	Mean Median	0.70 (1.26) 0 (0–1)	0.72 (1.33) 0 (0–2)	1.20 (1.56) 1 (0–2)	1.66 (1.91) 1 (0–3)	< .001	MS, TS > NT MS > OS
Handicap	Mean Median	0.74 (1.30) 0 (0–1)	0.85 (1.29) 0 (0–1)	1.04 (1.41) 0 (0–2)	1.41 (1.75) 1 (0–2.5)	.003	MS > NT

IQR = interquartile range. Results of Kruskal Wallis and Mann-Whitney *U* tests.

number/type of TMD symptoms influenced PWB, PD, and OHRQoL, and significant correlations were noted between total SPWB, DASS, and OHIP scores, both null hypotheses were rejected. Young adults were selected for the study sample, as they constitute up to 75% of TMD patients.[26] As the response rate was > 80%, the results can represent the study sample.[27,28] This study is among the first to explore the connection between TMD and PWB using the Ryff subscales.[14,15] The instruments that were used for assessing PWB, PD, and OHRQoL are all well-established measures that are widely applied in psychology and quality of life research. Moreover, both the DASS-21 and OHIP-14 have been used in earlier TMD work.[20,29–31] Besides allowing for comparison

Table 3 Mean (SD) and Median (IQR) Total and Domain SPWB-18, DASS-21, and OHIP-14 Scores Based on Type of TMD Symptoms

Variables		No symptoms (NT)	Pain-related (PT)	Intra-articular (IT)	Combined (CT)	*P*	Post hoc significant comparisons
SPWB-18							
Total	Mean Median	91.85 (10.68) 93 (85–99)	88.77 (11.05) 90 (82–96)	89.63 (10.16) 91 (84–96)	88.75 (11.13) 90 (82–95)	.008	NT > PT, CT
Autonomy	Mean Median	13.46 (2.73) 13 (12–15)	13.33 (2.58) 13 (12–15)	13.19 (2.70) 13 (12–15)	13.39 (2.98) 13 (11–15)	.930	–
Environmental mastery	Mean Median	14.68 (2.64) 15 (13–17)	13.44 (2.95) 14 (12–16)	13.76 (2.58) 14 (12–16)	13.99 (2.57) 14 (12–16)	< .001	NT > PT, IT
Personal growth	Mean Median	17.96 (2.25) 18 (17–20)	17.80 (2.39) 18 (17–19)	17.89 (2.12) 18 (17–19)	17.64 (2.39) 18 (16–19)	.736	–
Positive relations with others	Mean Median	14.80 (2.95) 15 (13–17)	14.26 (3.06) 15 (12–17)	14.25 (2.65) 14 (13–16)	14.24 (3.39) 14 (12–17)	.139	–
Purpose in life	Mean Median	15.30 (2.68) 16 (14–17)	15.26 (2.74) 15 (14–17)	15.73 (2.39) 16 (14–18)	14.99 (2.60) 15 (13.75–17)	.319	–
Self-acceptance	Mean Median	15.64 (2.86) 16 (14–18)	14.67 (3.09) 15 (13–17)	14.81 (3.33) 16 (12.5–17)	14.51 (3.01) 15 (12–17)	.001	NT > PT, CT
DASS-21							
Total	Mean Median	14.98 (8.57) 15 (9–20)	21.32 (10.16) 21 (15–26)	17.41 (8.61) 17 (11.5–23)	21.58 (10.11) 21 (14–28.25)	< .001	CT, PT > IT, NT
Depression	Mean Median	3.62 (3.16) 4 (1–5)	5.30 (3.71) 4 (3–7)	4.16 (2.96) 4 (2–6)	5.11 (3.56) 4 (3–7)	< .001	PT, CT > NT
Anxiety	Mean Median	5.00 (3.07) 5 (3–7)	7.55 (3.76) 7 (5–10)	6.09 (3.21) 6 (3.5–8)	7.56 (3.64) 7 (5–10)	< .001	PT, CT, IT > NT PT > IT
Stress	Mean Median	6.33 (3.59) 6 (4–9)	8.47 (4.09) 8 (6–11)	7.16 (3.80) 7 (4–9)	8.92 (4.24) 8 (6–12)	< .001	CT, PT > NT CT > IT
OHIP-14							
Total	Mean Median	7.20 (7.56) 5 (1–10)	11.75 (8.42) 11 (5–17)	6.61 (5.63) 5 (2–10)	13.52 (9.65) 11.5 (6–20)	< .001	CT, PT > IT, NT
Functional limitation	Mean Median	0.66 (1.14) 0 (0–1)	1.04 (1.39) 0 (0–2)	0.62 (0.99) 0 (0–1)	0.97 (1.29) 0 (0–2)	.006	PT > NT
Physical pain	Mean Median	1.60 (1.50) 2 (0–2)	2.31 (1.62) 2 (1–3)	1.60 (1.38) 2 (0–2)	2.66 (1.88) 2 (1–4)	< .001	CT, PT > IT, NT
Psychologic discomfort	Mean Median	1.34 (1.61) 1 (0–2)	2.15 (2.08) 2 (0–3)	1.39 (1.52) 1 (0–3)	2.65 (2.06) 2 (1–4)	< .001	CT, PT > IT, NT
Physical disability	Mean Median	1.11 (1.44) 1 (0–2)	2.06 (1.70) 2 (1–3)	0.94 (1.12) 1 (0–2)	2.26 (1.95) 2 (1–4)	< .001	CT, PT > IT, NT
Psychologic disability	Mean Median	1.06 (1.42) 0 (0–2)	1.81 (1.76) 2 (0–3)	0.95 (1.28) 0 (0–2)	2.33 (1.94) 2 (1–4)	< .001	CT, PT > IT, NT
Social disability	Mean Median	0.70 (1.26) 0 (0–1)	1.27 (1.61) 1 (0–3)	0.58 (0.93) 0 (0–1)	1.40 (1.73) 1 (0–2.25)	< .001	CT, PT > IT, NT
Handicap	Mean Median	0.74 (1.30) 0 (0–1)	1.11 (1.52) 1 (0–2)	0.54 (0.83) 0 (0–1)	1.25 (1.59) 1 (0–2)	< .001	CT, PT > IT, NT

IQR = interquartile range. Results of Kruskal Wallis and Mann-Whitney *U* tests.

Table 4 Correlations Between Number of TMD Symptoms, Total SPWB-18, Total DASS-21, and Total OHIP-14 Scores

Variables	Number of TMD symptoms	Total SPWB-18	Total DASS-21
No. of TMD symptoms	–	–	–
Total SPWB-18	–0.145**	–	–
Total DASS-21	0.291**	–0.550**	–
Total OHIP-14	0.302**	–0.267**	0.473**

**Significant according to Spearman correlation ($P < .01$).

with prior TMD research, the generic OHIP-14 was also chosen over a TMD-specific OHRQoL measure, such as the OHIP-TMDs,[32] to facilitate evaluation against other oral conditions.

Number of TMD Symptoms

The number of symptoms provided some indication of TMD severity, as MT participants will experience both pain- and function-related TMDs or marked TMJ dysfunction. Individuals without TMD symptoms usually had significantly higher scores for total SPWB, positive relations with others (developing positive relationships, displaying empathy and intimacy toward others), and self-acceptance (having positive self-regard and recognizing one's abilities/limitations) than those with two or more symptoms. This phenomenon may be related to the increased pain/dysfunction as well as PD and impairments to quality of life associated with the presence of more TMD symptoms. To date, only one other study examined the impact of the number of TMD symptoms on PD and OHRQoL based on the DC/TMD-SQ. Tay et al found that participants with differing numbers of symptoms exhibited significant disparities in PD and total OHIP-14 scores.[29] The findings of the present study corroborated those of Tay et al, with participants experiencing more TMD symptoms reporting higher depression, anxiety, stress, and total OHIP scores. Although a significant difference in PD was discerned between participants with and without TMD symptoms, total DASS and depression, anxiety, and stress domain scores among the OS, TS, and MS participants were insignificant. Participants with TMD symptoms also had significantly poorer OHRQoL than symptom-free participants. Among individuals with TMD symptoms, significant differences in total and domain OHIP scores were largely between individuals with multiple symptoms and those with one symptom. The largely low responsiveness of the SPWB-18, DASS-21, and OHIP-14 to the number of TMD symptoms could be attributed to the nondifferentiation of painful and nonpainful TMD symptoms. Painful TMDs, especially when chronic, have been associated with higher levels of PD and lower OHRQoL.[20,33–35]

Types of TMD Symptoms

Participants with painful TMDs often presented significantly lower total SPWB, environmental mastery (ability to create, choose, and control one's milieu according to personal needs/values), and self-acceptance than those with no TMD symptoms. Deficits in the latter two constructs were also identified in patients with rheumatoid arthritis, fibromyalgia, and chronic fatigue syndrome.[7–9] Schleicher et al found that women with fibromyalgia had significantly lower overall PWB than healthy controls; however, they determined that higher PWB was not related to pain, but rather to less fatigue and disability.[8] Jackson and MacLeod also hypothesized that PWB was independent of physical symptoms but related to PD in patients with chronic fatigue syndrome.[9] Moreover, Mangelli et al reported that chronicity of the illness rather than the disease itself affects PWB.[7] The association between painful TMD symptoms and PWB may therefore be mediated through PD, as well as physical and psychosocial disabilities connected with TMDs.

Participants with painful TMDs had significantly greater total DASS and higher levels of depression, anxiety, and stress when compared to symptom-free participants. Furthermore, those with TMD pain also recounted significantly greater total DASS, anxiety, and stress than their peers with nonpainful intra-articular symptoms. These findings were consistent with recent studies specifying that pain-related TMDs were associated with higher levels of PD when compared to intra-articular TMJ disorders in both patient and community samples.[20,36] TMD-related pain can originate from the masticatory muscles (myalgia) or the TMJs (arthralgia). While arthralgia is characterized by discrete inflammatory processes mediated via interleukins, tumor necrosis factor-α, and other cytokines, the pathophysiologic mechanisms for myalgia are still not well-defined.[37,38] Chronic myalgia associated with TMDs has been considered a functional pain syndrome akin to fibromyalgia, irritable bowel syndrome, and chronic fatigue syndrome. Central sensitization, which may be predisposed to the autonomic nervous system as well as genetic polymorphisms, was posited to be the common factor uniting the various conditions.[37] The latter may also explain the similarities in PWB and PD outcomes when related to earlier studies in patients with fibromyalgia and chronic fatigue syndromes.[8,9]

Systematic reviews have demonstrated that TMDs, especially painful subtypes, negatively affect OHRQoL, and the lower quality of life was caused by associated physical and psychologic conditions.[31,35] This was also observed in the present study. Besides the functional limitation domain, participants with TMD pain reported significantly greater impairments in total OHIP and in all OHIP domains than those with painless intra-articular and no TMD symptoms (ie, IT and NT groups). For the functional limitation domain, only the PT group had significantly higher scores than the NT group. Higher domain scores were noted for physical pain/disability and psychologic discomfort/disability, which substantiated the conclusion of Bitiniene et al.[31]

Correlations Between PWB, PD, and OHRQoL

Correlations between the number of TMD symptoms and total SPWB, DASS, and OHIP scores were weak, with r_s ranging from –0.15 to 0.30. The duration and type of TMD symptoms may therefore have a greater impact on PWB, PD, and OHRQoL than the number of symptoms. A positive and moderately strong correlation ($r_s = 0.47$) was

present between total OHIP and total DASS, suggesting that the bearing of TMDs on OHRQoL may be more influenced by PD. This finding is in agreement with that of Miettinen et al, who found that TMDs were related to OHRQoL in several ways, including pain intensity, pain-related disability, somatization, and depression.[6] Furthermore, the level of OHRQoL was determined to vary more across the psychosocial axis than with TMD diagnostic subtypes.[39]

Although the negative correlation between total SPWB and total OHIP was weak ($r_s = -0.27$), the association between total SPWB and total DASS was moderately strong ($r_s = -0.55$). Given this relationship, it is plausible that interventions focused on promoting positive functioning may help alleviate psychologic symptoms and the impact of chronic illnesses, including TMDs.[9] Well-being interventions include mindfulness meditation, acceptance and commitment therapy, and compassion-focused therapy, as well as traditional cognitive-behavioral therapy, which fosters self-management and positive self-attitude. Even though mindfulness meditation has been reported to improve quality of life, pain, and depressive symptoms,[40] well-designed clinical trials are required to establish its efficacy for chronic TMDs.

Study Limitations

Like other observational studies, this study has its limitations. First, the cross-sectional design employed does not permit causal relationships between TMD symptoms, PWB, PD, and OHRQoL to be determined. Nested case-control and case-cohort designs are needed to establish causality.[41] Second, the study is prone to various biases arising from the use of self-reported measures. While sampling and nonresponse biases might be allayed by the high response rate, other types of partialities, including recall, social desirability, and measurement biases, may still occur.[42] Third, the study sample consisted of young adults and a predominance of women, who may be more vulnerable to psychologic distress.[43] Findings might differ in children/adolescents as well as in matured adults and if more men were involved. Last, clinical and radiographic examinations were not performed to confirm the self-reported TMD symptoms. Additionally, participants with muscle and/or joint pain who may exhibit varied PWB, PD, and OHRQoL impairments were not distinguished. Future studies could incorporate the duration of symptoms, older and more male participants, and TMD patients verified using the DC/TMD protocol. The latter must be carried out before definitive deductions can be made.

CONCLUSIONS

The relationships between self-reported TMD symptoms and PWB, PD, and OHRQoL were established together with correlations among the latter variables. Symptom-free participants had significantly higher PWB than those with two and multiple TMD symptoms. They also reported significantly lower levels of PD and experienced better OHRQoL. In contrast, individuals with TMD pain had significantly more deficits in PWB compared to those who were symptom-free. In addition, they also had greater PD and poorer OHRQoL than their peers with nonpainful intra-articular and/or no TMD symptoms. While a moderately strong negative association was confirmed between total SPWB and total DASS, a moderately strong positive correlation was noted between total OHIP and total DASS. As the decline in PWB and OHRQoL associated with TMDs may be mediated via PD, well-being interventions targeted at alleviating psychologic symptoms may lessen the impact of pain-related TMDs and improve quality of life.

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Literature Abstract

Mental Foramen and Anterior Loop Anatomic Characteristics: A Systematic Review and Meta-analysis of Cross-sectional Imaging Studies

The present study aimed to review the epidemiologic, topographic, and morphometric aspects of the mental foramen (MF) and anterior loop (AL) on cone beam computed tomographic imaging studies. An International Prospective Register of Systematic Reviews (PROSPERO)–registered systematic review (CRD42018112991) was conducted according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. Two reviewers independently performed data extraction from observational studies evaluating MF and AL that were available on seven electronic databases. MedCalc software was used to perform a meta-analysis with a 95% confidence level. Of 1,545 articles, 66 met the inclusion criteria, totaling 14,233 patients from 5 continents, with a total of 6,655 females and 5,884 males (some studies did not report sex), with an age range between 8 and 89 years. The most prevalent shapes of MF were oval (48.72%) and circular (44.36%), and the most frequent horizontal positions were between premolars (43.66%) and in line with the long axis of the second premolar (43.12%). Based on the articles that assessed AL, the mean prevalence was 43.18%, with most studies reporting bilateral localization as the most prevalent. This finding suggests that, for most individuals, a distance of 5 mm mesially to the MF renders invasive procedures less prone to complications that could result in AL damage.

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