



Early Retirement Phase and TMD

Amal H Moubarak B.D.S., M.Sc., Ph.D^{1,2} and Souna Saad El-Din B.D.S., M.Sc., Ph.D

^{1,2} Professor in Prosthodontics, Department of Oral and Maxillofacial Prosthodontics, King Abdulaziz University- KSA.

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ABSTRACT

Objectives: To evaluate the effect of retirement on Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) and to study the relation between retirement and TMD-psychological profile. **Methods:** Longitudinal study was done on 50 male retired volunteers. RDC/TMD tool which consists of axis I (physical assessment, 84-item questionnaire and clinical examination for TMJ and muscles) and axis II (psychosocial and pain-related disability assessments depending on symptom checklist 90 (SCL-90) was selected. **Results:** Axis I, the highest percentage of retirees suffering from muscle disorder (MD) before and after retirement. Axis II, Number of pain items (NPI) decreased after retirement when the number is between 0-3 and it increased after retirement when it is 4-5. Graded Chronic Pain Scale (GCPS) moderate pain grade III increased after retirement from 18% to 30%. Psychosomatic profile scores and percentages indicate moderate depression in contrast to severe depression before and after retirement. Conclusion: Percentage of retirees fallen into depression increased after retirement and suffering more from muscle disorders type of TMD. RDC-TMD is a valuable tool for diagnosing TMD with different subgrouping.

Keywords: RDC/TMD: depression, somatization, retirement, TMJ

1. Introduction

Retirement is meaningful life-event that changes everyday life style. The psychological process of retirement follows the same spontaneous emotional pattern and phases that are naturally accompanying other aspects of life.

Retirement has been defined as that process which begin with planning and preparing for, while workers are still at work (Wang and Shultz, 2010). Retirees should familiarize themselves with the landscape of their new circumstances and navigate their lives accordingly (Wang, 2007). The period of transition into retirement offers a unique opportunity for researchers to study adaption and coping over changes in psychological and mental health before, during, and following retirement (Zaniboni, *et al.*, 2021 & Lee and Smith 2009).

In fact work may give meaning and a social context to peoples' lives and the absence of work may be difficult to deal with and may cause depressive response. Retirement by itself may not create depression (Lee and Smith 2009). However, the financial stress from losing job is a common stressful events for older adults (Lue *et al.*, 2010). This stress can be also originated as a result of empowerment, emotional instability and health condition (Abe, *et al.*, 2012, Fernández-Niño, *et al.*, 2018 & Segel-Karpas, *et al.*, 2018).

Epidemiologic studies that assess the process of human aging are very important, especially, when evaluating the oral health impact and its consequences in the elderly (Dahlström and Carlsson, 2010). Association between experiencing of stressful life events as retirement and muscle-related temporomandibular disorders has been reported. Psychological factors are known to play an important

Corresponding Author: Amal H Moubarak, Professor in Prosthodontics, Department of Oral and Maxillofacial Prosthodontics, King Abdulaziz University- KSA.
E-mail: amalscientific@yahoo.com

role in the etiology and severity of temporomandibular disorders (Colaco *et al.*, 2020 & Yekkalam and Wänman, 2014).

Another factor as host susceptibility plays a role in TMD. Genetically influenced physical traits determine disease onset and its progression. In addition, environmental parameters such as ethnicity, culture and stress are essential variables in the patient's susceptibility and demand for treatment (de Kanter, *et al.*, 2018, Gillborg, *et al.*, 2017 & Reiter, *et al.*, 2006).

Depression and chronic widespread pain are risk factors for orofacial muscle pain. Studies suggest that stress-related disorders may contribute to the development of TMD chronicity and may therefore be viewed as perpetuating rather than initiating factors (Reiter, *et al.*, 2015).

The Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) specifies a dual-axis diagnostic system for temporomandibular disorders (TMD) supported by a well-operationalized history and examination protocol. The Axis I clinical assessment protocol is designed to render TMD diagnoses, and the Axis II screening instruments assess psychological status and pain-related disability. Together, Axis I and Axis II assessments constitute a comprehensive evaluation consistent with the biopsychosocial health model. (Schiffman, *et al.*, 2014).

The aim of this study was to evaluate the effect of early phase of retirement on TMD by RDC including psychosomatic profile.

2. Material and Methods

Fifty male retired volunteers (58-60 years) were participated and informed about the study and gave them informed consent. Criteria for exclusion from the study were the followings: (a) major physical illness (b) presence of polyarthritis or other rheumatic diseases; (c) acute dental pain. Data were collected twice, 6 months before and after retirement. At the beginning, all participants who reported at least two of the cardinal signs or symptoms of TMD: Jaw pain, limited mouth opening, muscle pain or TMJ noise were diagnosed as non- RDC/TMD patient.

For RDC/TMD measurements, the data collection was done by one investigator to assess TMD signs and symptoms as suggested by the literature (Schiffman, *et al.*, 2014). Distribution of the Arabic version of (RDC/TMD) questionnaire (87 items) on study participants was achieved including the dual axis system. Then, a clinical examination of TMJ and the surrounding muscles was done according to the standardized published specifications (<https://ubwp.buffalo.edu>).

1. Scoring of the findings for subsequent grouping and subgrouping according to Axis I criteria into 3 categories as shown in table 1.
2. Asses the level of the psychosomatic status of participants and the TMD related psychological disability according to Axis II criteria.

Subjects completed the RDC/TMD Axis II self-report measures, which include the Graded Chronic Pain Scale (GCPS) which depends on the Characteristic Pain Intensity (CPI) and Jaw Disability Checklist, and the Revised Symptom Checklist (SCL-90-R) (Derogatis, *et al.*, 1973 & Osiewicz, *et al.*, 2018).

GCPS domain is composed of six items assessed (Q7:9 and 11:13) on a 10-point scale, and one item on the number of disability days (Q10) due to facial pain and scoring criteria are simple to use. It assesses pain intensity, interferences with usual activities, family and leisure activities, work-related activities. Then, assessment of the psychological status using mean depression and somatization scores from subscales of the Symptom Checklist-90 (SCL-90) (Derogatis, 1983).

The psychological status was assessed through depression (DEP) and non-specific physical symptom (somatization SOM) scores measured with subscales of SCL-90-R. The questionnaire included 32 questions with 5-point Likert response scale (ranged from 0 to 4), 12 items of somatization subscale and 20 items of depression subscale with total of 32 items. The domain was derived from items 20 (a, c, d, j, o, p, r, s, t, u, w and x) when pain items were excluded, the remaining domain consisted of items 20 (c, r, s, t, u, w and x) finally the domain for depression was derived from items 20 (b, e, f, g, h, I, k, l, m, n, q, v, y, z, aa, bb, cc, dd, ee, ff.) .The five nonspecific pain conditions examined were incorporated into the SCL-90, and patients were considered to have a pain item if they responded "moderately" to "extremely" when asked how much the pain item distressed them in the last month (Dworkin, and Leresche, 1992, Yap, *et al.*, 2002 & Manfredini, *et al.*, 2011).

Table 1: RDC/TMD groups and subgroups for axis I

Groups	Subgroups
Group I: muscle disorders(MD)	Ia. Myofascial pain.
	Ib. Myofascial pain with limited opening.
Group II: disc displacements(DD)	IIa. Disc displacement with reduction.
	IIb. Disc displacement without reduction with limited opening.
	IIc. Disc displacement without reduction with limited opening.
Group III: arthralgia, osteoarthritis, osteoarthrosis(AAA)	IIIa. Arthralgia.
	IIIb. Osteoarthritis of the TMJ.
	IIIc. Osteoarthrosis of the TMJ.

Characteristic Pain Intensity (CPI) was evaluated through scoring items in the questionnaire about pain history. The patient's score ranged from 0 to 100, with 100 being the most intense pain. Disability Points was calculated as the sum of points for disability days and points of disability score.

The GCPS was used to classify individuals according to Characteristic Pain Intensity and Disability Points on grades (I to IV). The detailed description of each grade is shown in table (2). The DEP and SOM mean scale score is calculated by summing up the score of the single items. This makes possible to rate patients as having normal, moderate or severe levels of impairment in the depression and non-specific physical symptoms scales. The limit of each is shown in table (2) (Manfredini, *et al.*, 2006 & Manfredini, *et al.*, 2010).

Table 2: Grading scores for Axis II

Item	Description
GCPS	Grade 0: no TMD pain in the previous 6 months
	Grade I Low disability: Low Intensity Characteristic Pain Intensity < 50, and less than 3 Disability Points
	Grade II : High Intensity Characteristic Pain Intensity > 50, and less than 3 Disability Points
	Grade III High Disability: Moderately Limiting 3-4 Disability Points, regardless of Characteristic Pain Intensity
	Grade IV: Severely Limiting 5 -6 Disability Points regardless of Characteristic Pain Intensity
DEP	no (≤ 0.535)
	Moderate($0.535-1.105$)
	Severe(≥ 1.105)
SOM(with pain items included)	no (≤ 0.500)
	Moderate($0.500-1.00$)
	Severe(≥ 1.00)
SOM(with pain items included)	no (≤ 0.428)
	Moderate($0.428-0.857$)
	Severe(≥ 0.857)

Collected data were statistically analyzed. Calculation of mean and standard deviation and comparison through Chi-squared test at the 5% level of confidence were performed using SPSS foundation for statistical computing (Vienna, Austria. ISBN3-900051-07-0).

3. Results

The mean age of our participants was 59.1 years. Before retirement (BR), regarding Axis I (84%) had no MD, subgroup Ia was found in (10%) and subgroup Ib was found in (6%).

Group II DD, 4-2% of the participants demonstrated subgroup IIa and IIb respectively in the right side (RT) of the joint. 2% demonstrated subgroup IIa in the left side (LT) of the joint.

Group III AAA, no participants demonstrated any of the in the right side of the joint. Only 2% demonstrated subgroup IIIa in the left side of the joint. The total number of TMD before retirement was 26%.

After retirement (AR), regarding Axis I (80%) had no MD, subgroup Ia was found in (14%) and subgroup Ib was found in (6%).

Group II DD, no change was found in the percentage in the right side (RT) of the joint. Raising into 4% was found in subgroup IIa in the left side (LT) of the joint.

Group III AAA, no change was found in the percentage in both sides. The total number of TMD before retirement was 32% as shown in table (3) & fig (1).

Table 3: The distribution of the participants according to axis I groups and subgroups.

Group	I MD		II DD		III AAA		Total
	Ia	Ib	RT	LT	RT	LT	
BR			IIa 2	IIa 1	IIIa 0	IIIa 1	13
	5	3	IIb 1	IIb 0	IIIb 0	IIIb 0	
			IIc 0	IIc 0	IIIc 0	IIIc 0	
AR			RT	LT	RT	LT	16
	7	3	IIa 2	IIa 2	IIIa 0	IIIa 1	
			IIb 1	IIb 0	IIIb 0	IIIb 0	
			IIc 0	IIc 0	IIIc 0	IIIc 0	

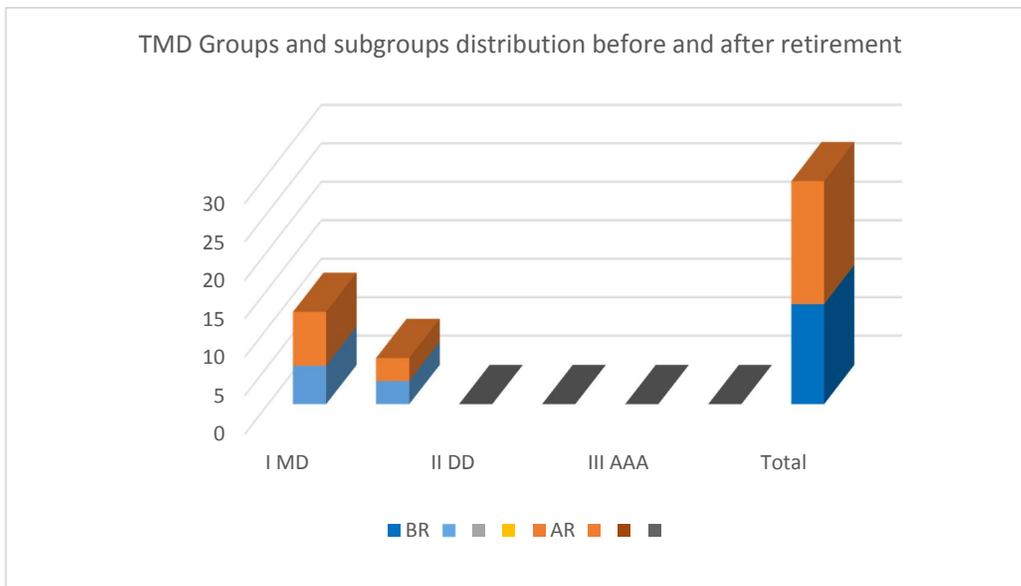


Fig. 1: TMD groups and subgroups distribution before and after retirement (MD: muscle disorder DD: disc displacement AAA: arthralgia, osteoarthritis, osteoarthritis)

In Axis II, Number of pain items (NPI) before and after retirement decreased (-) after retirement when the number varied from 0 to 3 items and adversely it increases (+) after retirement when the number varied from 4 to 5 items as shown in table 4.

Table 4: Number of pain items (NPI) before and after retirement

NPI	0	1	2	3	4	5
BR	9	7	5	4	15	10
AR	6	6	4	3	17	14
(+) (-)	(-)	(-)	(-)	(-)	(+)	(+)

Regarding GCPS which denotes pain level, mild pain expressed by grades I&II has been ranged from 24-23% respectively, while moderate pain grade III increased after retirement from 18% to 30%. Also, severe pain grade IV increased after retirement to reach 4% in contrast to 0% before retirement. These data are presented in table 5 and figure 2

Table 5: Chronic pain grade scale (GCPS) before and after retirement

GCPS	0	I	II	III	IV
BR	17	13	11	9	0
AR	10	11	12	15	2
%	27	24	23	24	2

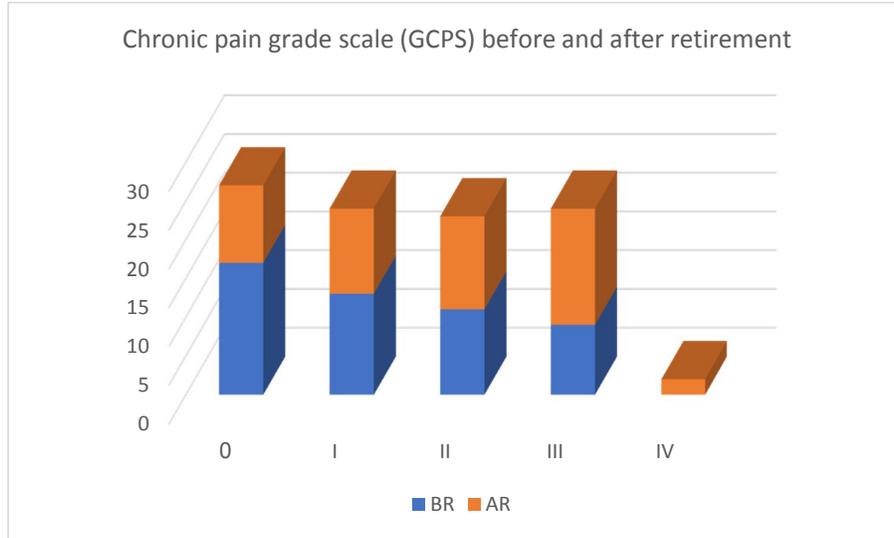


Fig. 2: Chronic pain grade scale (GCPS) before and after retirement

Axis II psychosomatic profile scores and percentages indicate moderate depression with mean value of (0.973) in contrast to severe depression with mean value (1.122) before and after retirement and increase the percent of retirees fallen into depression from 12% to 22% after retirement. In regard to depression, there is statistically significant difference with P- value of (0.047) between volunteers before and after they retired.

In contrast, somatization with or without pain showed increase in the mean values and percentages of both moderate and severe levels after retirement but within the range of moderate values. Regarding somatization, no statistically significant difference between volunteers before or after they retired. Psychosomatic items are presented in table 6 and figure 3

Table 6: Psychosomatic profile before and after retirement

Psychosomatic profile		BR	AR	BR%-AR%
Depression (DEP)	No	34	32	68% – 64%
	Moderate	10	7	20%-14%
	Severe	6	11	12%-22%
	M±SD	0.973±0.10	1.122±0.23	
Somatization (SOM-with pain)	No	36	33	72% – 66%
	Moderate	9	11	18%-22%
	Severe	5	6	10%-12%
	M±SD	0.533±0.3	0.811±0.4	
Somatization (SOM-without pain)	No	36	32	72% – 64%
	Moderate	8	10	16%-20%
	Severe	6	8	12%-16%
	M±SD	0.567±0.4	0.664±0.2	

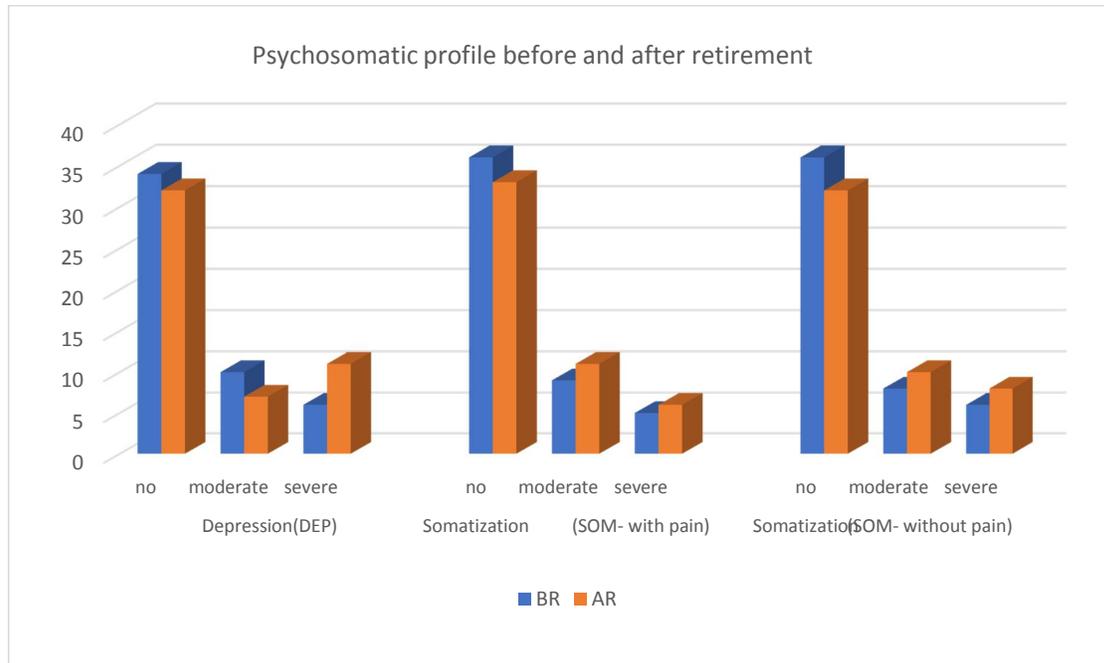


Fig. 3: Depression and somatization scores before and after retirement

4. Discussion

One of the primary aims of the implemented RDC/TMD classification system was to facilitate cross-population comparison between different investigations and to increase knowledge on TMD epidemiology and to circumvent confusion generated by the use of multiple terms to indicate the same disorder. (Schiffman, *et al.*, 2014). The better standardized capability and reliability of RDC tool in comparing TMDs groups is appreciated in many studies (Manfredini, *et al.*, 2011, Ohrbach, *et al.*, 2008, Steenks, and De Wijer, 2009 & Karatas, O., *et al.*, 2013). To our knowledge, this is the first study to examine the relationship between RDC/TMD axis I and axis II findings in retirement period.

TMD symptoms have a prevalence peak between 30-35 years of age and another peak 50-55 years old (Guarda-Nardini, *et al.*, 2012). This finding is in consistence with our result as volunteers' average age 59.1 years demonstrated high percentage up to 26-32% in comparison to middle age which has less percentage 18- 30%.

Our study denotes that most of our participants belong to group I muscle disorder before and after retirement. This is quite similar to work done by Osiewicz *et al.*, (2018) who found the prevalence of group I is more than the other two groups. Group II disorders was found in 9% of patients, most of them were diagnosed with disc displacement with reduction. This high frequency agrees with other studies done by John and Reissmann (John, *et al.*, 2007; Manfredini, *et al.* 2011). This was followed by, group III inflammatory-degenerative disorders subgroup in about 2%, with arthralgia being the most frequent diagnosis. Up to our knowledge, only few studies reported the prevalence of each subgroup diagnosis, thus limiting the possibility to discuss the findings in the general population in depth (Manfredini, *et al.* 2011).

Regarding DD with reduction, the range was from 6 - 8%, while the two subgroups of DD without reduction had a lower frequency range 0-2%. The observation that disc displacement is common, has been suggested by many authors (Nguyen, *et al.*, 2017 & Winocur, *et al.*, 2009) such findings, along with the well-described high variability of disc position in asymptomatic subjects as well (Anderson, *et al.*, 2010), lend support to the hypothesis that disc displacement can sometimes be considered a non-pathologic or, at least, a non-treatment- requiring condition .

Nearly 63% of our participants complained of three or more pain items as proved in table 4 which may be attributed to the elevated levels of depression/somatization. Linking multiple pains to the somatic expression of psychiatric and psychosocial disturbance is supporting our results which is logically being more noticeable in elder age group (Yap *et al.*, 2002; Reiter *et al.*, 2018; Valesan *et*

al., 2021).

Our results revealed nearly 24% had mild to moderate psychosocial dysfunction of grades I, II and III, and 2% had severe grade IV on GCPS (Reiter, *et al.*, 2006 & Yap, *et al.*, 2002). Studies done on Swedish, American and Jewish populations demonstrated average percentage between 13-20% of grade III CPS and also found that Arab people had higher values of dysfunctional activity which is in concurrence to our findings (Gillborg, *et al.*, 2017 & Reiter, *et al.*, 2006).

This can be explained by the less quality of health care and profound referral to ENT specialties rather than TMD ones. There is a similar matching results regarding diminished percentage of grade IV in many earlier studies (Song, *et al.*, 2018 & Pigozzi, *et al.*, 2021).

Our results regarding DEP scores are higher than those found in other studies. This diversity in percentage might be attributed to differences in ethnic, race, social, psychological, cultural, and political nature (Reiter, *et al.*, 2006). On the other hand our results are similar to that reported for Arabian females in the study (DEP 60%) by Reiter *et al.* (2006). TMD and depression were interrelated in many studies (Lue *et al.*, 2010; Abe *et al.*, 2012; Fernández-Niño *et al.*, 2018; Segel-Karpas, 2018). As stress has been reported as a provoking factor for TMD (Nassif *et al.*, 2003).

Before retirement, a moderate level of depression and somatization was revealed as shown in tab.6. The major sources of stress might be related to their age-related problems like health status, sleep disorders, drugs taken which exacerbated by stress anxiety accompanying fear of loss of financial resources and change in their life styles. Depression scores have been increased significantly after retirement due to the added psychological stress expressed by remarkable increase in nonspecific physical symptoms scores which could possibly explains the condition (Celić *et al.*, 2011). Our findings call attention to the need for clinical research with RDC accompanying further progression into retirement and the importance of prevention and intervention of stress amongst retirees.

5. Conclusion

Positive relation between TMD and early retirement phase when comparing data by RDC/TMD. Higher scores of muscle disorder, depression and somatization are clear in participants after retirement

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