

Temporomandibular Disorders: Prevalence and Comparison of Signs and Symptoms between Genders among Physiotherapy Students from University Fernando Pessoa, Portugal

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Abstract

The etiology of Temporomandibular Disorders (TMD) is multifactorial and is manifested by a set of signs and symptoms that can affect the morphological or functional integrity of the Temporomandibular Joint (TMJ). The purpose of this study was to assess the prevalence of TMD in physiotherapy students at University Fernando Pessoa (UFP), Portugal, analyzing the presence and relation of signs and symptoms by gender. A total of 146 physiotherapy students (53 male and 93 female) participated in this study. A questionnaire about the presence of pain in TMJ in different moments of student life and the Fonseca anamnestic questionnaire were used to assess the prevalence and its severity. The prevalence of TMD was 73.3% (67.9% male and 76.3% female). The total score was higher in women and mild severity was the most frequent level in the participants. In female, age proved to be associated with the level of severity of TMD and being tense/nervous a risk factor in the appearance of this dysfunction. Female students felt pain in TMJ at any moment and male during exams. In conclusion, the prevalence of signs and symptoms of TMD was high, having females a higher score and being tense/nervous was considered a risk factor.

Keywords: Temporomandibular joint; Temporomandibular disorders; Signs and symptoms; Students; Physiotherapy

Introduction

Temporomandibular joint (TMJ) is one of the most complex articulations of human body. This is due to its rotational and translational movements and the double articulation of the condyle that depends on the harmony between occlusion, neuromuscular balance and the joint itself [1]. TMJ is one of the most used joints, moving between 1500 to 2000 times a day [2], with its movements of opening, closing, laterality, protrusion and retrusion, it is responsible for functions such as chewing, speaking, yawning, swallowing and breathing which, when submitted to pressure, occlusive changes, trauma, tension, among others, have negative effects on the musculature and compromises its articulation, giving rise to temporomandibular disorders (TMD) [3].

TMD has a multifactorial etiology, and it may be related to changes in occlusion, traumatic or degenerative lesions of the TMJ, systemic diseases, internal injury of the articular disc, musculoskeletal injuries, hypo mobility or hypermobility of the TMJ and dysfunctions of the cervical, in addition to psychological factors and bad oral habits [4]. In general, the main signs and symptoms of TMD are joint pain, neck pain, pain while chewing, headache, crackling, nostalgia, facial pain, functional limitation, mouth opening limitation, tinnitus, jaw pain and toothache [5,6].

TMD is more common in females, with a proportion of five for each man [7]. This may be due to biological differences in relation to men, such as ligament laxity and the hormonal system [8]. It affects people of different ages, however, its incidence is higher between 20 and 45 years [7], that according to [3] until the age of 40, the main cause is of muscular origin (myogenic TMD) since the age of 40 the main etiological factor is joint degeneration (arthrogenic TMD) [9], tmds have a negative impact on people's quality of life, with 59.09% reporting feeling impaired in work activities, 59.09% feeling injured at school, 68.18% in sleep and 63.64% in appetite/food. Epidemiological studies that have been conducted about TMD, on patient and non-patient populations, have revealed that around 60%-75% of the subjects will manifest one TMD sign and 35% TMD symptom. Moreover, TMD signs are present in 50%-75% of the population at some moment in life, whereas an estimated 35% exhibit mild symptoms [10].

The prevalence of TMD is around 40 and 60% in the general population, and yet only about one in four people with signs are aware of or report any symptoms [11]. Among students, this prevalence varies from 15 to 92%, depending on the origin of the students and the diagnostic method used, representing a common health problem in this population group [12,13]. An increase in symptoms occurs until young adulthood, after which they maintain those levels [14]. There is evidence that stress leads to increased muscle activity causing pain to the region close to TMJ [15,16] also say that there are evidence to suggest that anxiety, stress, and other emotional disturbances may exacerbate TMD.

Health professionals have high levels of anxiety, a characteristic that begins in the university, where many students complain about these symptoms, right in the first year of the graduation, with a tendency for these stress levels to increase throughout the academic year [17]. Up to date there is no study that estimated prevalence rate of TMD among physiotherapy students in Portugal, however in a Brazilian study, 90% of the physiotherapy students accused some sort of TMD [18], whereas 63.4% of physiotherapy students of [19] study accused TMD. Therefore, the objective of the present study was to assess the prevalence of TMD in physiotherapy students at the University Fernando Pessoa, analyzing the presence and the relation of signs and symptoms by gender.

Materials and Methods

Sample

A cross-sectional, observational, epidemiological study was carried out, covering 146 physiotherapy students from at University Fernando

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Received date: November 29, 2021; **Accepted date:** December 13, 2021; **Published date:** December 20, 2021

Citation: Cervaens M, Amaral L (2021) Temporomandibular Disorders: Prevalence and Comparison of Signs and Symptoms between Genders among Physiotherapy Students from University Fernando Pessoa, Portugal. J Oral Hyg Health 9:S6:001.

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Pessoa (UFP), Porto, Portugal, registered in 2019/2020, of both genders and aged between 18 and 35 years old. All questionnaires completed voluntarily online by these students were included, according to the database of the UFP Communication and Image Office and students must be over 18 years old. In turn, as exclusion criteria, it was considered questionnaires not completely or incorrectly filled out and when informed consent was not given.

The protocol for the project in question was approved by UFP Ethics Committee. The participants, who voluntarily accepted their participation in the study, were guaranteed the rights of privacy, anonymity and confidentiality of the data throughout the study and the possibility of withdrawing at any time, without any personal loss, were also safeguarded, as described in the Declaration of Helsinki, dated 1964.

Instruments

The data for the characterization of the sample as well as some questions of symptomatology were collected by filling out a questionnaire carried out by the researcher. This questionnaire was made up of some personal questions, such as, age, weight, height (for calculating the Body Mass Index - BMI), gender, if there is pain in TMJ, and at what time does this pain appear (internship; exams; internship and exams; at any time).

To check whether the individual has TMD, the Fonseca Anamnestic Index was used. The Fonseca Anamnestic Index [20] is one of the few instruments in Portuguese used to characterize TMD symptoms and classify the subjects according to the severity of these symptoms. This assessment instrument is validated and translated into Brazilian Portuguese, with a 95% reliability percentage [21]. This index is composed of 10 questions that are related to TMJ, specifically addressing parameters such as chewing, jaw movement, joint noise, and Para functional habits, perception of malocclusion, neck pain, headache and emotional state. It is easy to understand, so the user's influence on students and their responses is very small. The simple and quick application favours its use in epidemiological studies [22]. For each question there are 3 possible answers, yes, sometimes and no, worth 10 points, 5 points and 0 points respectively. After writing down the 10 responses, all points were added, so that, according to the result, the degree of TMD symptoms was classified. There are four types of classification: with a score between 0 and 15 points, dysfunction is not attributed; if it is between 20 and 40 points it corresponds to a mild TMD, between 45 and 65, the TMD is considered moderate and, finally, results above 65 points are equivalent to a severe TMD [23].

The questionnaires were made available online by the UFP's Communication and Image Office, sent via student's e-mail, only to Physiotherapy course (with of a population of 443 students), who wanted to and who was available to answer, in order to be filled out in Google Forms. All students wishing to participate had to complete a signed informed consent, explaining the purpose of the study, the confidentiality of the data and the freedom to refuse the study. The collection of the questionnaires took place from September 25, 2019 to November 21, 2019 and the completion of the questionnaire took approximately 10 minutes. A calculation of the representativeness of the sample, relative to the population of physiotherapy students at UFP was made through the Sample size calculator with a margin of error of 5% and a confidence interval of 95%.

Statistics

Data processing was performed using the SPSS program (Statistical Package for Social Sciences), version 26.0 for Windows. To characterize

the sample in terms of age, BMI and the results of the questionnaires applied, the mean, minimum, maximum and standard deviation were used. Descriptive analysis of the characterization of qualitative variables through relative frequencies (%) was also performed. Compliance with the assumption of normality was analysed using the Kolmogorov-Smirnov test and it was observed that the variables followed a normal distribution. To compare the biological characteristics of female and male physiotherapy students, the Student T test for independent samples was applied. And, for the inferential statically analyses the Fisher test or the Chi-square test was used to verify the existence of associations between gender and other variables. Linear logistic regression was performed to estimate possible risk factors, both biological and symptomatic, in case of TMD. A significance level of $p \leq 0.05$ was considered.

Results

Of a total of 443 physiotherapy students at UFP, the number of respondents was 33% of population size, resulting in a margin of error of 6.65%.

Sample

A sample of the present study was carried out by 146 students of the Physiotherapy course at UFP, genders, 53 (36.3%) male students and 93 (63.7%) female students. The biological characteristics of Physiotherapy students are described in Table 1.

The age of the entire sample varies between 18 and 35 years, with no significant differences between genders ($p=0.149$). As for weight and height, male students have significantly higher values compared to female students ($p=0.000$). However, BMI values are similar in both genders (0.070).

Temporomandibular disorders

Frequency: Table 2 shows the frequency of TMD in the sample of physiotherapy students. Analyzing the entire sample, it appears that the majority of students, that is 73.3%, have TMD, as well as female students (76.3%) and male students (67.9%). Fisher's test shows that variables with and without TMD are not statistically associated with gender ($p=0.222$).

Risk/protection in the appearance of TMD: And, in Table 3, the probability of the existence of biological characteristics that can be considered risk factors or protectors of having TMD was analyzed. Analyzing the biological variables, it appears that the variables were not considered risk factors ($0.110 < p < 0.748$).

Frequency of different moments of TMJ pain occurrence: TMJ pain can be referred to at different times in student life and its association with gender was analyzed (Table 4). The variables gender and the different moments of pain occurrence (signs and symptoms) in TMJ are associated. The female students state that their pain often occurs at any time (36.6%), followed by the exam period (33.3%), while in male students, the highest percentage of students (34%) refers no pain, and 32.1% complain during the exam period.

Fonseca anamnestic questionnaire: The participants of this study obtained an average value in the total score of the Fonseca anamnestic questionnaire of 35.24 ± 21.22 points, with male students having a score of 30.57 ± 19.68 and female 37.90 ± 21.70 points, with significant differences between them ($p=0.044$). In order to assess the severity of signs and symptoms in TMD, the participants in the present study answered the questions in the Fonseca anamnestic questionnaire (Table 5).

	Total N=146 (Med ± SD) Min-Max	Male N=53 (Med ± SD) Min-Max	Female N=93 (Med ± SD) Min-Max	P
Age (years)	22.38 ± 2.87 18-35	22.83 ± 3.27 18-35	22.12 ± 2.59 18-34	0.149
Weight (Kg)	64.43 ± 11.58 42.0-107.0	72.05 ± 11.57 46.0-107.0	60.08 ± 9.13 42.0-90.0	0.000*
Height (m)	1.68 ± 0.09 1.50-1.94	1.76 ± 0.09 1.53-1.94	1.64 ± 0.06 1.50-1.80	0.000*
BMI (Kg/m ²)	22.65 ± 3.17 16.50-34.10	23.28 ± 2.92 18.40-34.10	22.29 ± 3.27 16.50-33.30	0.07

Table 1: Biological characteristics of physiotherapy students. Note:* Represents p value, p<0.05; T Test for independent samples.

	Total N=146 n (%)	Male N=53 n (%)	Female N=93 n (%)	P
Without TMD	39 (26.7)	17 (32.1)	22 (23.7)	0.222
With TMD	107 (73.3)	36 (67.9)	71 (76.3)	
Total	146 (100)	53 (100)	93 (100)	

Table 2: Frequency of TMD presence.

	OR	P	95% C.I.	
			Lower	Upper
Age	-1.607	0.11	-0.047	0.005
Weight	-0.344	0.731	-0.092	0.065
Height	0.326	0.745	-5.173	7.217
BMI	0.322	0.748	-0.181	0.251
Gender	0.589	0.557	-0.138	0.255

Table 3: Risk/protection factors in the appearance of TMD.

	Total N=146 n (%)	Male n=53 n (%)	Female n=93 n (%)	p
No	36 (24.7)	18 (34.0)	18 (19.4)	0.041*
Internship	4 (2.7)	1 (1.9)	3 (3.2)	
Exams	48 (32.9)	17(32.1)	31(33.3)	
Internship and exams	12 (8.2)	5 (9.4)	7 (7.5)	
Any moment	46 (31.5)	12 (22.6)	34 (36.6)	
Total	146(100)	53 (100)	93 (100)	

Table 4: Frequency of different moments of TMJ pain occurrence, and its association with gender. Note:* Represents p value.

Fonseca questions	Male n (%)			Female n (%)			p
	No	Sometimes	Yes	No	Sometimes	Yes	
Do you have difficulty opening your mouth?	43(81.1)	9 (17.0)	1(1.9)	61 (65.6)	23 (24.7)	9 (9.7)	0.026*
Do you have difficulty moving your jaw to the sides?	45 (84.9)	4 (7.5)	4 (7.5)	68 (73.1)	18 (19.4)	7 (7.5)	0.257
Do you feel fatigue or muscle pain when you chew?	45 (84.9)	5 (9.4)	3 (5.7)	65 (69.9)	16 (17.2)	12 (12.9)	0.050*
Do you have headaches?	25 (47.2)	15 (28.3)	13 (24.5)	24 (25.8)	30 (32.3)	39 (41.9)	0.007*
Do you have neck pain or a stiff neck?	35 (66.0)	12 (22.6)	6 (11.3)	31 (33.3)	39 (41.9)	23 (24.7)	0.000*
Do you have ear aches or pain in the area temporomandibular joint?	31 (58.5)	16 (30.2)	6 (11.3)	28 (30.1)	38 (40.9)	27 (29.0)	0.001*
Have you ever noticed any noise in your TMJ while chewing or opening your mouth?	22 (41.5)	11 (20.8)	20 (37.7)	30 (32.3)	24 (25.8)	39 (41.9)	0.371
Do you have any habits such as clenching or grinding your teeth?	26 (49.1)	6 (11.3)	21 (39.6)	36 (38.7)	15 (16.1)	42 (45.2)	0.32
Do you feel that your teeth do not come together well?	45 (84.9)	3 (5.7)	5 (9.4)	76 (81.7)	7 (7.5)	10 (10.8)	0.682
Do you consider yourself a tense (nervous) person?	21 (39.6)	24 (45.3)	8 (15.1)	17 (18.3)	32 (34.4)	44 (47.3)	0.000*

Table 5: Signs and symptoms in TMD of the fonseca anamnestic questionnaire. Note:* Represents p value.

Through the table, it is possible to verify that the female has always obtained higher values in most of the analyzed items, such as the difficulty during mouth opening ($p=0.026$), muscle pain or tiredness during mastication ($p=0.050$), frequent headache ($p=0.007$), neck pain, TMJ pain, as well as the fact that the individual considers himself a tense/nervous person ($p \leq 0,000$). On the contrary, some items had similar values, such as the difficulty during lateral deviations, TMJ sounds when chewing, habits of clenching/grinding teeth, and malocclusion perception ($0.257 < p < 0.682$).

Risk/protection factors in the appearance of TMD by gender: Possible risk/protection factors were investigated in the different items of the Fonseca anamnestic questionnaire by gender (Table 6). When certain signs and symptoms are observed integrated in the Fonseca questionnaire, female students who have perception of stress is 3.9 times more likely to have TMD.

Degrees of TMD by gender: An individual with TMD can have different degrees of severity. Table 7 shows the different severity degrees of a TMD,

and its relationship with the gender of physiotherapy students. In the total, 47.3% have a mild TMD, and the lowest frequency is severe cases (8.2%). When divided by gender, the percentage value of mild severity is identical, 47.2% in males and 47.3% in females, and the values with a lower percentage are also those of severe TMD (3.8% in sex male and 10.8%, female). Thus, no associations with statistical value were observed in the association between gender and severity degrees ($p=0.118$).

Degrees of TMD by age groups and by gender: Table 8 shows the degrees of TMD by age groups and by gender and their association. Table 8 shows that age is only statistically associated with TMD severity in females ($p=0.044$).

TMD severity level: Table 9 shows the level of severity of TMD in individuals who reported the presence (constant or temporary) or absence of each sign or symptom included in the Fonseca questionnaire. Most of the participating students with severe dysfunction (75%) answered that they had the perception of stress (tense/nervous), Para functional habits and TMJ sounds. A large proportion of students with moderate severity

	Male n=53				Female n=93			
	OR	p	95% C.I.		OR	p	95% C.I.	
			Lower	Upper			Lower	Upper
Difficulty during mouth opening	0.328	0.745	-0.061	0.084	-0.771	0.443	-0.043	0.019
Difficulty during lateral deviations	0.272	0.787	-0.047	0.061	0.253	0.801	-0.03	0.038
Pain during mastication	1.59	0.119	-0.012	0.097	-1.746	0.085	-0.049	0.003
Headache	0.904	0.371	-0.024	0.063	0.332	0.741	-0.021	0.03
Neck pain	-0.179	0.859	-0.047	0.039	1.249	0.215	-0.009	0.04
TMJ pain	0.781	0.439	-0.029	0.065	1.202	0.233	-0.01	0.04
TMJ sounds	1.117	0.27	-0.018	0.062	1.899	0.061	-0.001	0.04
Parafuncional habits	0.218	0.828	-0.034	0.043	-0.1	0.92	-0.022	0.02
Malocclusion perception	-0.206	0.838	-0.056	0.045	1.511	0.135	-0.006	0.047
Perception of stress	0.016	0.988	-0.044	0.044	3.926	0.000*	0.022	0.068

Table 6: Risk/protection factors in the appearance of TMD by gender.

	TMD-Free N (%)	Mild N (%)	Moderate N (%)	Severe N (%)	p
Male	17 (32.1)	25 (47.2)	9 (17.0)	2 (3.8)	0.016
Female	22 (23.7)	44 (47.3)	17 (18.3)	10 (10.8)	0.016
Total	39 (26.7)	69 (47.3)	26 (17.8)	12 (8.2)	0.016

Table 7: Frequency of TMD degrees and its association with the gender of physiotherapists.

TMD-Free n(%)	Mild n(%)	Moderate n(%)	Severe n(%)	p	TMD-Free n(%)	Mild n(%)	Moderate n(%)	Severe n(%)	p	TMD-Free n(%)	Mild n(%)	Moderate n(%)	Severe n(%)		
Total (n=146)					Male (n=53)					Female (n=93)					
2 (5.1)	9 (13.0)	2 (7.7)	0 (0)		0 (0)	3 (12.0)	2(22.2)	0(0)		2 (9.1)	6(13.6)	0 (0)	0 (0)		
15(38.5)	26 (37.7)	10(38.5)	1 (8.3)		6 (35.3)	8(32.0)	2(22.2)	1(50.0)		9 (40.9)	18 (40.9)	8 (47.1)	0 (0)		
7 (17.9)	23 (33.3)	11(42.3)	5 (41.7)	0.879	2 (11.8)	9 (36.0)	3 (33.3)	0 (0)	0.056	5 (22.7)	14 (31.8)	8 (47.1)	5 (50.0)	0.044*	
9 (23.1)	4 (5.8)	2 (7.7)	4 (33.3)		4 (23.5)	2 (8.0)	2 (22.2)	1 (50.0)		5 (22.7)	2 (4.5)	0 (0)	3 (30.0)		
3 (7.7)	3 (4.3)	1 (3.8)	1 (8.3)		2 (11.8)	1(4.0)	0 (0)	0 (0)		1 (4.5)	2 (4.5)	1 (5.9)	1 (10.0)		
1 (2.6)	3 (4.3)	0 (0)	0 (0)		1 (5.6)	2 (8.0)	0 (0)	0 (0)		0 (0)	1 (2.3)	0 (0)	0 (0)		
2 (5.1)	1 (1.4)	0 (0)	1 (8.3)		2 (11.8)	0 (0)	0 (0)	0 (0)		0 (0)	1 (2.3)	0 (0)	1(10.0)		
39	69	26	12		17	25	9	2		22	44	17	10		

Table 8: TMD levels by age and gender, and their association. Note:* Represents p value.

		TMD Free n(%)	Mild n(%)	Moderate n(%)	Severe n(%)	p
Difficulty during mouth opening	Yes	2 (5.1)	2 (2.9)	2 (7.7)	4 (33.3)	0.000*
	Sometimes	5 (12.8)	12 (17.4)	10 (38.5)	5(41.7)	
	No	32 (82.1)	55 (79.7)	14 (53.8)	3 (25.0)	
Difficulty during lateral deviations	Yes	1(2.6)	4 (5.8)	2 (7.7)	4 (33.3)	0.000*
	Sometimes	3 (7.7)	9 (13.0)	7 (26.9)	3 (25.0)	
	No	35 (89.7)	56 (81.2)	17 (65.4)	5 (41.7)	
Pain during mastication	Yes	4 (10.3)	1 (1.4)	2 (7.7)	8 (66.7)	0.000*
	Sometimes	1 (2.6)	11 (15.9)	7 (26.9)	2 (16.7)	
	No	34 (87.2)	57 (82.6)	17 (65.4)	2 (16.7)	
Headache	Yes	3 (7.7)	32 (46.4)	11 (42.3)	6 (50.0)	0.000*
	Sometimes	16 (41.0)	14 (20.3)	10 (38.5)	5 (41.7)	
	No	20 (51.3)	23(33.3)	5(19.2)	1(8.3)	
Neck pain	Yes	4(10.3)	11(15.9)	8 (30.8)	6 (50.0)	0.000*
	Sometimes	7 (17.9)	30 (43.5)	12 (46.2)	2 (26.7)	
	No	28 (71.8)	28 (40.6)	6 (23.1)	4 (33.3)	
TMJ pain	Yes	3 (7.7)	15 (21.7)	9 (34.6)	6 (50.0)	0.000*
	Sometimes	10 (25.6)	30 (43.5)	10 (38.5)	4 (33.3)	
	No	26 (66.7)	24 (34.8)	7 (26.9)	2 (16.7)	
TMJ sounds	Yes	7(17.9)	29(42.0)	14(53.8)	9(75.0)	0.000*
	Sometimes	8 (20.5)	19 (27.5)	6 (23.1)	2 (16.7)	
	No	24 (61.5)	21 (30.4)	6 (23.1)	1 (8.3)	
Parafunctional habits	Yes	13 (33.3)	28 (40.6)	13 (50.0)	9 (75.0)	0.001*
	Sometimes	4 (10.3)	7 (10.1)	8 (30.8)	2 (16.7)	
	No	22 (56.4)	34 (49.3)	5 (19.2)	1 (8.3)	
Malocclusion perception	Yes	1 (2.6)	5 (7.2)	4 (15.4)	5 (41.7)	0.000*
	Sometimes	3(7.7)	3(4.3)	2(7.7)	2(16.7)	
	No	35 (89.7)	61 (88.4)	20 (76.9)	5 (41.7)	
Perception of stress	Yes	6 (15.4)	22 (31.9)	15 (57.7)	9 (75.0)	0.000*
	Sometimes	10 (25.6)	35 (56.6)	8 (30.8)	3 (25.0)	
	No	23 (59.0)	12 (17.4)	3 (11.5)	0 (0)	

Table 9: TMD severity level of the entire sample. Note:* Represents p value.

(76.9%), mild (88.4%) and without TMD (89.7%) responded that had no malocclusion perception. The same percentage of students without TMD (89.7%) also reported having no difficulty during lateral deviations.

Discussion

This study aimed to evaluate the prevalence of TMD and compare between genders in physiotherapy students by using the Fonseca's questionnaire. Subjects with TMD can be studied through the signs and symptoms that characterized this condition. Fonseca's questionnaire collect a large quantity of these information in a relatively short period, is easy to understand, has almost no influence of the investigator [24], and can be very useful for early detection and diagnosis of TMD.

Studies that analyzed the prevalence of TMD in students using Fonseca's questionnaire varied from 20 to 90%. These prevalence rates were reported by different populations: Brazil with 55.4% [25], 63.4% [19], 68.61% [26], 68.63% [27], 71.9% [28] and 90% [19], Nepal with 31% [29] and 47.4% [30], Canada with 41.4% [31], Turkey with 47.53% [32] and India with 22.6% [24]. This variability may be due to the different requirements of each course and the sociodemographic characteristics of the samples from the various studies. Three of these studies analyzed in different courses [24,26,27], two in healthy science courses [28,32] and the rest in more specific populations, like medical students [31], medical and dental students [29,30], dental students [25] and at last in physiotherapy students [18,19] as the present study.

In this study 146 physiotherapy students were included and 73.3%

had some sort of TMD severity whereas 47.3% was mild, 17.8% moderate and 8.2% severe. The most prevalent degree of TMD was the mild for both males and females in this sample. This agree with the studies that obtained similar findings by using the same questionnaire [18,19,24,27,30,32], however, this prevalence was higher in females than in males as well as [18,19,27,28,30,32], in all severity degrees, where there was a significant difference between the total score, but no statistically association between TMD severity and gender, which are consistent with [32]. The reasons for the higher prevalence in females still not completely clear, however, hormones that interfere with pain threshold and higher flaccidity of joints, genetic, emotional factors as well as less masticatory muscular structure and lower back pain have been suggested as possible explanations [27,33-35]. In this study, the biological characteristics analyzed, like age, weight, height, BMI and gender were not considered as a risk factor.

Moreover, according to [36], the peak for the development of signs and symptoms of TMD is between 20 and 40 years, which are during the reproductive period. In this study, the mean age of the sample was 22.4 years and the prevalence of TMD was not affected by age, which is similar to other studies [24, 31], neither age was a risk factor in the appearance of TMD. However, when analyzed by gender only the female had an association between age and different levels of TMD severity, with a higher prevalence of TMD between 20 and 23 years of age, regardless of the level of severity. Specifically, at 20 or 21 years there were more women with mild and moderate TMD but also without TMD. Regarding to the severe TMD this was more prevalent in female with 22-23 years. In female and male students, the highest frequency without TMD is between 20 and 21 years

old, followed by 24-25. These findings contradict the idea that advancing age enhances the appearance of TMD, thus, there is no pattern of evolution of TMD severity with age, corroborating with other study [14].

In female, the most prevalent symptom in the questionnaire was being a tense/nervous person, who was significantly associated with gender and TMD severity. These results are in consonance with other study [32], and was also seen in others [18,24,31] in males and females' students. TMD patients normally are anxious, perfectionist, dominators and tend to express their anxiety through physical symptoms [28]. Psychological states are one of the etiological factors of TMD [27] and special attention should be given to students in the physiotherapy course, because are more likely to develop TMD [37] as seen in this study. This may be due to the extent of the curriculum, with high demands of the academic term as exams, internships, seminars, with limited time for interpersonal and intrapersonal relationships that can directly lead to greater levels of anxiety and stress [18,24,27,28]. When the students of these sample were asked at what time they felt more pain in TMJ, the majority answered exams, however, when analyzed by gender there was a significant association with the time where pain appears, being more prevalent in females feeling at any moment or only during exams.

Student activities may somehow create situations of physical/emotional stress/tension.

Being tense in female was the only symptom that accused being near to four times a risk factor of developing TMD and therefore the early diagnosis and management of these disorders become very important in these students. When the subject is submitted to an emotional overload, in order to release tension starts having Para functional habits [24,28]. This may be conscious or unconscious, during sleep or awake, being teeth clenching the most common habit, which in turns produces circulatory changes in masticatory muscles or compression on pain receptors due to fluid increase in the muscle compartment [38]. In addition to Para functional habits, female students observed an association between tension/nervousness and headache, neck pain, TMJ pain, as well as the presence of TMJ sounds. In general, 75% of the students who presented severe levels of TMD considered them tense/nervous and reported having Para functional habits as well as TMJ sounds.

In fact, in males, having Para functional habits was the most prevalent answer in the Fonseca's questionnaire, although this was the second answer more prevalent in female, but not statistically associated with gender. This is considered one of the most harmful factors for TMJ [32] highlighting the grinding typical of bruxism, subconscious or not, can cause dental wear and also tension in masticatory muscles, and therefore problems in TMJ [19,39] refer that the prevalence of bruxism is higher in young adults in comparison with older adults. In this study, habits were not considered a risk factor.

The next most prevalent reported TMD problem was TMJ sounds followed by headaches. These were the most prevalent symptoms found in Brazilian dental students [25]. TMJ sounds is one of the most common TMD symptoms, with different types of sounds that are directly related to the movement between the disc and the condyle [40]. In this study, between these two, only headache was significantly associated with gender, being the female with a higher prevalence as well as [35]. According [41], epidemiological studies assessed that headache are present in 50 to 80% of individuals with TMD and with females being more frequently affected. A prominent theory proposed for TMD involvement in headache is that it can occur as a result of a dysfunctional masticatory system, where muscle hyperactivity is often caused by dental temporomandibular disharmony [42]. However, headache reported by individuals may have a cause other

than muscle or joint overload, which must be associated with other symptoms to consider the presence of TMD [43]. In fact, headache can be related to TMJ pain and neck pain which are considered etiological factors of developing TMD [19,41]. Neck pain or neck stiffness may be caused by abnormalities, inflammations, or injury to the neck, or referred pain from masticatory muscles [44].

All the reported problems were significantly associated with TMD severity, as similar to [29,32], with the exception of [30] that was not significant with the difficulty of lateral deviations. Students from the present study experienced also by order of prevalence, TMJ pain, neck pain, malocclusion perception, and pain during mastication, difficulty during lateral deviations and difficulty during mouth opening, being significantly associated with gender, except for malocclusion perception and difficulty of lateral deviations. TMD patients usually suffer from masticatory and cervical pain, TMJ pain and/or sounds, incoordination of mandibular movements having also limited range of motion [31] and malocclusion.

The limitations of this study are the use of a brief questionnaire, whose responses may lead to subjectivity and/or to a hypo or hyper-valuation of the referenced symptoms. The questionnaire was carried out online, which can reduce participants' adherence. In this study there was a response of 33% of all physiotherapy students at UFP enrolled in the academic year 2019/2020. For this reason, the present sample is not representative of the population; therefore it is not possible to extrapolate the results obtained to another population. However, the results of this study highlight the importance of an early diagnosis, warning the necessity of regular examinations for university students, in this case, physiotherapy students, in order to facilitate drawing guidelines for prevention and management of TMD. A longitudinal prospective study is recommended to analyze the incidence of TMD.

Conclusion

The present sample, consisting of 33% of the population of Physiotherapy students at UFP, of both genders, reported a frequency of TMD of 73.3%, being the mild severity more prevalent in both genders. The prevalence of TMD in male students was 67.9%, and in female students 75.3%, with no significant differences between genders, but when comparing the total score of the questionnaire, female students had a significant higher score. However, gender was not considered a risk factor in the appearance of this disorder but it was significantly associated with TMJ complaints at different times in student life. And, both in general and in some specific TMD signs and symptoms, the greatest occurrence occurs in female students. Of these signs and symptoms, the fact that female is tense/nervous presented an increased risk of about four times more to develop TMD. Gender, like the different ages of physiotherapy students, was not associated with degrees of TMD severity. However, there was a significant association between TMD severity degrees and the frequency of the presence or absence of TMJ signs and symptoms. Analyzing the different ages in female students there was a significant association with TMD severity degrees.

References

1. Donnarumma MD, Muzilli CA, Ferreira C, Nemr K (2010) Temporomandibular dysfunctions: Symptoms, and multidisciplinary approach. *Revista Cefac* 12:788-794.
2. Aoyama AY, Pavia A, Pachioni CA, Faria CR, Ferreira DM (2011) Temporomandibular dysfunction and its relationship with posture. *In Colloquium Vitae* 3:270-276.
3. Biasotto-Gonzalez D (2009) Interdisciplinary approach to temporomandibular dysfunctions. *Braz J Oral Sci* 11(3):401-405.
4. Sproesser JG. (2010) Characteristics of interocclusal relationships in individuals with mastication performed preferentially on both sides and symptoms of temporomandibular dysfunction. *J Vasc Bras* 22; 2(5):1-5.

5. Gonçalves VM, Leite CA, Barbosa LF, Romero NS (2009) Prevalence of sinuses, symptoms and factors associated with temporomandibular dysfunction carriers. *Acta Sci Health Sci* 31:159-163.
6. Pereira KN, Andrade LL, Costa ML, Portal TF (2005) *Revista CEFAC* 7: 221-228.
7. Malouf SA, Moreno BG, Alfredo PP, Marques AP, Rodrigues G (2008) Therapeutic exercises for temporomandibular disorders: a literature review. *Fisioter. Pesqui* 15:408-415.
8. Garcia JD, Oliveira AA (2017) Physiotherapy shows us symptoms and symptoms of temporomandibular dysfunction. *Acta Odontol Bras* 6:111-122.
9. Oliveira AS, Bermudez CC, Souza RA, Souza CM, Dias EM, et al. (2003) Life impact of patients with temporomandibular dysfunction. *J Appl Oral Sci* 11:138-143.
10. Olivares HA, Saucedo FL, Nova AP (2016) Temporomandibular joint disorder prevalence in resident physicians at the specialties hospital La Raza national medical center. *Rev Odontol Mex* 20: e8–e12.
11. Plesh O, Adams SH, Gansky SA (2011) Temporomandibular joint and muscle disorder-type pain and comorbid pains in a national US sample. *J Orofac Pain* 25:190-198.
12. Wahid A, Mian FI, Razzaq A, Hussain Bokhari SA, Kaukab T, et al. (2014) Prevalence and Severity of temporomandibular disorders (Tmd) in undergraduate medical students using Fonseca's questionnaire. *Pak J Med Sci* 34(1).
13. Al Moaleem MM, Okshah AS, Al-Shahrani AA, Abdulkhalq AF, Alshadidi, AAF, et al. (2017) Prevalence and severity of temporomandibular disorders among undergraduate medical students in association with Khat Chewing. *J Contemp Dental Pract* 18:23-28.
14. Magnusson T, Egermark I, Carlsson GE (2005) A prospective investigation over two decades on signs and symptoms of temporomandibular disorders and associated variables. A final summary. *Acta Odontol Scand* 63(2):99-109.
15. Martins RJ, Garcia AR, Garbin CA, Sundfeld ML (2007) Association between economic class and stress in temporomandibular joint dysfunction. *Braz J Epidemiol* 10(2):215-222.
16. Majumder K, Sharma S, Siwach V, Arya V, Gulia S (2015) Prevalence and Sex Distribution of Temporomandibular Disorder and Their Association with Anxiety and Depression in Indian Medical University Students. *Int J Clin Med* 6: 570-578.
17. Fernandes AU, Garcia AR, Zuim PR, Cunha LD, Marchiori AV (2010) Temporomandibular disorder and anxiety in dentistry graduates. *Braz Dent Sci* 10:70-77.
18. Queiroz N, Magalhães K, Machado J, Viana M (2015) Prevalence of temporomandibular dysfunction and association with Para functional habits in some of the strength university physiotherapy course. *Rev Rede cuid health* 9: 1-14.
19. Pinto AL, Gomes JVF, Mesquita CM, Ripardo ECN, Silva EF, et al. (2015) Prevalence of temporomandibular dysfunction and quality of life in Physiotherapy academics. *J Health Sci Inst* 33: 371-375.
20. Fonseca DM, Bonfante G, Valle AL, Freitas SF (1994) Anamnestic diagnosis of craniomandibular dysfunction. *RGo* 42: 23-28.
21. Oliveira A, Bevilacqua-Grossi D, Dias E (2008) Signs and symptoms of temporomandibular dysfunction in different Brazilian regions. *J Bras Pneumol* 15: 392-397.
22. Correa E, Capeletti A, Dega M, Papa L (2011) Temporal-Mandibular Dysfunction and Postural Assessment: an Interdisciplinary Approach. *Eletronica Saúde Magazine: Pesquisa e Reflexoes* 1: 1-7.
23. Karthik R, Hafila MI, Saravanan C, Vivek N, Priyadarsini P, et al. (2017) Assessing prevalence of temporomandibular disorders among university students: a questionnaire study. *J Int Soc Prev Community Dent* 7:S24-S29.
24. Nomura K, Vitti M, Oliveira AS, Chaves TC, Semprini M, et al. (2007) Use of the Fonseca's questionnaire to assess the prevalence and severity of temporomandibular disorders in Brazilian dental undergraduates. *Braz Dent J* 18: 163-167.
25. Oliveira AS, Dias EM, Contato RG, Berzin F (2006) Prevalence study of signs and symptoms of temporomandibular disorder in Brazilian college students. *Braz Oral Res* 20: 3-7.
26. Ton LA, Mota IG, De Paula JS, Martins AP (2020) Prevalence of temporomandibular disorder and its association with stress and anxiety among university students. *Braz Dent Sci* 23:1-9.
27. Augusto VG, Perina KC, Penha DS, Santos DC, Oliveira VA (2016) Temporomandibular dysfunction, stress and common mental disorder in university students. *Acta Ortop Bras* 24: 330-333.
28. Rokaya D, Suttagul K, Joshi S, Bhattarai BP, Shah PK, et al. (2018) An epidemiological study on the prevalence of temporomandibular disorder and associated history and problems in Nepalese subjects. *J Dent Anesth Pain Med* 18:27-33.
29. Acharya S, Chaulagain R, Pradhan A, Shah A (2018) Temporomandibular Joint Disorders and its Relationship with Parafunctional Habits among Undergraduate Medical and Dental Students. *J Med Sci* 14:154-159.
30. Rashed SA, Elsharkawy AT (2018) Prevalence and severity of temporomandibular disorders signs and symptoms among students of the Ahrm Canadian University (ACU). *Dent J* 64: 2097-2104.
31. Dervis NE (2019) Prevalence of Temporomandibular Disorder in Turkish University Students: a Questionnaire Study. *J Den Med* 23: 80-87.
32. Motghare V, Kumar J, Kamate S, Kushwaha S, Anand R, et al. (2015) Association Between Harmful Oral Habits and Sign and Symptoms of Temporomandibular Joint Disorders Among Adolescents. *J Clin Diagn Res* 9: ZC45-ZC48.
33. Winoccur E, Littnerus D, Admsusb I, Gavish A (2006) Oral habits and association with signs and symptoms of temporomandibular disorders in adolescents: a gender comparison. *Oral Surg Oral Med Oral Pathol Oral Radiol Endod* 102:482-487.
34. Menezes MS, Bussadori SK, Fernandes KP, Biasotto-Gonzalez DA (2008) Correlation between headache and temporomandibular dysfunction. *J Bras Pneumol* 15: 183-187.
35. Lemos GA, Silva PLP, Paulino MR, Moreira VG, Beltrao RTS, et al. (2015) Prevalence of temporomandibular dysfunction and association with psychological factors in dental students. *Rev Cub Estomatol* 52:22-31.
36. Ryalat S, Baqain ZH, Amin WM, Sawair F, Samara O, et al. (2009) Prevalence of temporomandibular joint disorders among students of the university of Jordan. *J Clin Med Res* 1: 158–64.
37. Christensen LV (1971) Facial pain and internal pressure of masseter muscle in experimental bruxism in man. *Arch Oral Biol* 16: 1021–31.
38. Strausz T, Ahlberg J, Lobbezoo F, Restrepo CC, Hublin C, et al. (2010) Self-reported bruxism from adolescence to young adulthood: a nine-year follow-up. *J Oral Rehabil* 37: 497-500.
39. Okeson JP (2014) Management of Temporomandibular Disorders and Occlusion-E-Book. Elsevier Health Sciences.
40. Ciancaglini R, Radaelli G (2001) The relationship between headache and symptoms of temporomandibular disorder in the general population. *J Dent* 29: 93-98.
41. Cooper BC, Kleinberg I (2009) Relationship of Temporomandibular Disorders to Muscle Tension-Type Headaches and a Neuromuscular Orthosis Approach to Treatment. *J Craniomandibular Pract* 27: 101-108.
42. Feteih RM (2006) Signs and symptoms of temporomandibular disorders and oral parafunctions in urban Saudi Arabian adolescents: a research report. *Head Face Med* 25.
43. Chi SI, Kim HJ, Seo KS, Lee JH, Chang J (2016) Local anesthesia of the temporomandibular joint to reduce pain during mouth opening for dental treatment in a patient with spinal muscular atrophy. *J Dent Anesth Pain Med* 16:137-140.
44. Becker IM (1995) Occlusion as a causative factor in TMD. Scientific basis to occlusal therapy. *N Y State Dent J* 61:54-57.