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Original Article

Prevalence of clinical signs and diagnosis of temporomandibular disorders in adults with intellectual disability

Prevalência de sinais clínicos e diagnóstico de disfunções temporomandibulares em adultos com deficiência intelectual

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Resumo

Introdução: A dor temporomandibular em indivíduos com deficiência intelectual foi explorada em apenas alguns estudos. No entanto, observa-se que a dor nessa população frequentemente permanece não detectada e inadequadamente tratada. **Objetivo:** Avaliar e comparar os sinais e o diagnóstico de disfunção temporomandibular (DTM) em adultos com e sem deficiência intelectual (DI). **Material e método:** Foi realizado um estudo transversal com grupo de comparação. Dados referentes ao gênero e à idade do grupo com DI foram coletados a partir de prontuários médicos disponíveis nas instituições de educação especial. Esses dados do grupo de comparação foram coletados nas clínicas odontológicas da Universidade Federal do Paraná (UFPR). Utilizamos o eixo I do RDC/TMD, com o auxílio da UPAT. O exame clínico avaliou dor muscular e articular, padrão de abertura bucal, extensão dos movimentos mandibulares e ruídos articulares. O teste do Qui-quadrado, o teste de Fisher e o pós-teste de Bonferroni foram utilizados com nível de significância de 5%. **Resultado:** Foram avaliados dois grupos homogêneos em relação ao gênero (P = 0,08) e idade (P = 0,419), dos quais 97 adultos tinham deficiência intelectual e outros 96 não tinham deficiência intelectual. Não foi observada diferença significativa entre os grupos em relação aos sinais de DTM (p>0,05). O grupo de comparação apresentou significativamente mais deslocamento de disco com redução (DDCR) (P=0,011). Quando comparamos as diferenças em relação ao gênero, as mulheres do grupo de comparação tiveram maior prevalência de diagnósticos de DTM (p<0,05), mas essas diferenças não foram encontradas no grupo com DI (p>0,05). Em relação à idade, apenas o grupo de comparação mostrou significância estatística, com o diagnóstico de dor miofascial com abertura limitada sendo mais diagnosticado em indivíduos jovens (p=0,009). **Conclusão:** Adultos com DI têm prevalência semelhante de sinais e sintomas de DTM em comparação com adultos sem DI. As diferenças de gênero não são significativas no grupo com DI.

Descritores: Deficiência intelectual; dor orofacial; disfunção temporomandibular.

Abstract

Introduction: Temporomandibular Pain among individuals with intellectual disabilities has been explored in only a few studies. Nevertheless, it is noted that pain in this population often remains undetected and inadequately treated. **Objective:** To evaluate and compare, signs and diagnosis of temporomandibular disfunction (TMD) in adults with and without intellectual disability (ID). **Material and method:** A cross-sectional study with comparison group was conducted. Data regarding gender and age of ID group were collected from medical records available in the institutions of special education. These data from the comparison group were collected in the dental clinics of the Federal University of Parana (UFPR). We using

the RDC/TMD I axis, with the help of the UPAT. The clinical examination evaluated muscle and joint pain, mouth opening pattern, extension of mandibular movement and joint noise. The Chi-squared test, Fisher's test, and Bonferroni's post-test were used with significance level of 5%. **Result:** Two homogeneous groups by gender (P = 0.08) and age (P = 0.419) were evaluated, of which 97 adults with intellectual disability and another 96 did not have intellectual disability. No significant difference was observed between groups on TMD signs (p>0.05). The comparison group had significantly more disc displacement with reduction (DDWR) (P=0.011). When we compare the differences with respect to gender. Overall, women in the comparison group had higher prevalence for TMD diagnoses (p<0.05), but these differences were not found in the ID group (p>0.05). Regarding age, only the comparison group showed statistical significance, with the diagnosis of myofascial pain with limited opening being more diagnosed in young individuals (p=0.009). **Conclusion:** Adults with ID have similar prevalence of TMD signs and symptoms to adults without ID. Gender differences are not significant in the ID group.

Descriptors: Intellectual disability; orofacial pain; temporomandibular joint disorders.

INTRODUCTION

According to data from the National Health Population Survey, approximately 1% of the Brazilian population self-declare with intellectual disability, which corresponds to approximately two million people affected[1]. Intellectual disability (ID) is a condition that impairs cognitive, motor and social skills of the individual, interfering directly in their interpersonal relationships[2]. Few studies observed the pain among people with ID[2,3]. However, it has been reported that pain often goes undetected and undertreated in this group[4,5]. There has been controversy how whether people with intellectual disability experience pain, if are less sensitive to pain or have a higher pain threshold[6]. This occurs because people with ID does not report pain, can present self-injurious behavior and impaired/different communication[7]. Therefore, assessing a chronic pain condition in this population represents a challenging.

Temporomandibular dysfunctions (TMD) refer to a heterogeneous group of pathologies that affect the masticatory muscles, temporomandibular joint (TMJ) and associated structures[8]. Its etiology is multifactorial, originated by the combination of psychological, physiological, structural, postural and genetic factors, which alter the functional balance between the fundamental elements of the stomatognathic system[9]. The disruption of the balance of this system, depending on the magnitude, duration and associated factor, can result in orofacial dysfunction[10]. The main signs and symptoms of TMDs involve TMJ pain, muscle tenderness on palpation, changes in mandibular mobility and joint noise[11]. Few studies have evaluated the relationship between TMD and ID, these studies usually looked at the prevalence of TMD signs in this population. The data suggest that this population has a high prevalence of TMD signs[12].

It is known that quality of life of patients with TMD is compromised, since the painful symptoms present can lead to psychological disorders that directly affect the physical and mental well-being of those who have them[13]. Among the factors that seem to influence chronic pain in people with ID, we have low levels of physical activity[14], more physical comorbidities[15], increased prevalence of musculoskeletal disorders[16], and reduced use of/or access to services for the management of pain.

The biopsychosocial model explains how biological, psychological, and social factors influence the perception of pain in individuals[17]. The importance of this model in the understanding of pain is consolidated and well accepted in the literature for the general population, however, we do not know how these influences take place in people with ID. If one on the one hand individuals with ID have factors that increase their risk of chronic pain, on the other we don't know if there are psychological characteristics acting as “protective factors”. In this context, the aim of this study was to evaluate and compare, signs and diagnosis of TMD in adults with and without intellectual disability. The hypothesis of the study was that adults with ID would present TMD signs and symptoms as much as the control group.

MATERIAL AND METHOD

Ethical Statement and Study Design

A cross-sectional study with comparison group was performed according to the Helsinki Declaration and was approved by the local ethical committee of Federal University of Parana (Protocol and approval number #2.044.005). This study is conformed to the STROBE[18] guidelines and signed informed consent was obtained from the parents/guardians.

Participants

A total of 160 adults with ID diagnosis, students from two special education schools (Menino Jesus Special School and Primavera Special School), were invited to participate in this study. Data were collected from July 2018 to November 2019, in Curitiba, Brazil. The inclusion criteria were adults with medically diagnosed ID, but able to establish adequate communication with logical reasoning and presenting good socializing skills; between 18 to 60 years old; and both genders. Adults who did not present adaptive functioning, and consequently did not obey the verbal commands for the research and those who did not want to participate in the research were excluded from the study.

The final sample was composed of 97 adults with Intellectual Disability (ID group) and 96 without ID (CMP group). For the comparative group the only factor adopted was being between 18 to 60 years old, they were recruited in the same period among patients who have received some dental treatment at Federal University of Parana. Gender and age data for both groups were obtained from medical records. The participants were examined according to the Research Diagnostic Criteria for Temporomandibular Disorders (RDC/TMD) protocol by one calibrated examiner (YMP), and the diagnosis was set according to RDC/TMD.

Sample Calculation

The estimation of sample size to evaluate the prevalence of TMD in the studied population was performed considering the following parameters: population size of 125 individuals, an anticipated frequency of 50%, a confidence limit of 5% and a design effect of 1. Using these parameters, the calculations resulted in a sample size of 95 individuals. (www.openepi.com/samplesize). The number of 125 corresponds to the number of students enrolled in the institution where the research was conducted. We chose this form of sample calculation because there are no other studies that have investigated of the same outcome, so we collected the same number of participants for the comparison group.

Clinical Examination

Anamnestic data gathering and clinical examination were conducted according to the original RDC/TMD guidelines[6] by the adoption of the standard, internationally accepted Portuguese revised version of the instrument available since 2009[12]. The present study reports prevalence data of RDC/TMD axis I diagnosis. Due to the cognitive deficit presented by Intellectual disability group and consequently helping to reduce bias and for better understanding the responses, the identification of functional jaw pain was measured by Universal Pain Assessment Tool (UPAT)[5].

TMD signs were assessed through clinical examination performed by a single examiner throughout the study. The researcher did receive RDC/TMD calibration training by an experienced clinical researcher, which helped to record the data during the examinations. Previously, a pilot study

was conducted for intra-examiner calibration to evaluate the reliability of the RDC/TMD axis I diagnosis. The 26 volunteers that participated at this stage were evaluated at two moments, with a week interval to minimize changes in their pain condition. Kappa value (k) of the RDC/TMD diagnoses was calculated as an estimation of the intra-examiner reliability. The strength of agreement was classified according to Landis, Koch (1977)[19] criteria as 'almost perfect' for the diagnosis of TMD pain (κ= 0.81, data not presented) and 'substantial' for no TMD pain (κ= 0.80, data not presented).

It is important to point out that when the data were collected in the schools, dental chairs were available in the schools, and the data from the comparison group were collected in the University clinics. During the clinical examinations, the participants were kept in the dental chair in a way that they ensured to be comfortable, when questioned before and during the examination. The following characteristics were assessed: maximum mouth opening; opening pattern; TMJ joint noises (clicking or crepitus), that were detected while placing fingers over the TMJ on either the right and the left side during opening and closing movements; muscle and TMJ palpation. According to the RDC/TMD, when the individual indicates pain, one should ask if it was mild (1), moderate (2) or severe (3). In this study, an adaptation was performed to that orientation. When patients reported the presence of pain, they should point out the severity of their pain, using the UPAT scale[5]. Patients were given one or more of the following group/subgroup diagnoses: muscle disorders (group I), disc displacement (group II), and/or arthralgia, osteoarthritis and osteoarthrosis (group III). The RDC/TMD classification system allows multiple diagnoses, however different diagnoses within each group are mutually exclusive.

The digital palpation, performed with the operator facing the subject, was carried out with a pressure of 1.0 kgf/cm^2/s to the extraoral muscles and approximately 0.5 kgf to the TMJs, as recommended by the RDC/TMD [10,19]. The pressure application rate was previously calibrated using an algometer (Wagner Force Dial TM FDK 40, Greenwich, CT)[15]. The masseter (origin, body, and insertion) and the 3 bellies of the temporalis muscles (anterior, middle, and posterior) were tested on both sides in a relaxed posture[15]. Articular pain was also determined for the TMJs, with palpation of lateral and dorsal poles. Throughout the examination, the individual's head was firmly supported passively by the operator's opposing hand.

Statistical Analyses

Data were analyzed using the Statistical Package for the Social Science (IBM SPSS® for Apple OS, version 21.0, Armonk, NY: IBM Corp). All inferential analyses were attributed to a level of significance of $p < 0.05$. To guarantee the distribution between independent variables of groups ID and CMP, Chi-square and T student tests was performed. Student Test were used for the age variable. The parametric Student T test was used for independent samples. The variable age (≥ 30, 31 to 50 or ≤51 years) was dichotomized into three different groups. The association between the signs and diagnosis of TMD variables with presence or absence of Intellectual disability, gender and was verified through the Chi-square test or Fisher's Exact test when one cell or more had a count less than 5. The Bonferroni Correction was used when more than two groups with a statistical difference, was detected. For this analysis, we used the OpenEpi (Open-Source Epidemiologic Statistics for Public Health, Version. www.OpenEpi.com).

RESULT

Demographic Characteristics

In total, 193 participants were included in this study. Table 1 demonstrates the sample distribution by age and gender. Ninety-seven patients were diagnosed with Intellectual disability, 49 females and 48 males, with a mean age of 32.4 ±8.7 (range 18-60 years), and 96 control

subjects, 61 females and 35 males, with a mean age of 33.5±10.1 (range 18-56 years) were examined. The differences in age (p=0.419) and gender (p=0.08) between the groups were not statistically significant.

Table 1. Descriptive analysis of the independent variables of groups with (ID) and without (CG) Intellectual Disability

Variable	ID Group (*n*=97)	Comparative Group (*n*=96)	Total (*n*=193)	P value
Gender (*n, %*)				
Female	49 (50.5%)	61 (63.5%)	110 (57%)	0.08
Male	48 (49.5%)	35 (36.5%)	83 (43%)	
Age (Mean, SD)	32.40 (8.767)	33.51 (10.127)	32.95 (9.44)	0.419

P value calculated from T student and X^2 tests.

Temporomandibular Signs and Diagnoses in Individuals with and without Intellectual Disability

Table 2 describes the prevalence of temporomandibular dysfunction signs and diagnoses for both groups. There were no significant differences in the presence of TMD signs between the groups (p>0.05). Regarding TMD diagnoses, there was a statistically significant difference only regarding disk displacement with reduction, which is more prevalent in the comparison group (p=0.011).

Table 2. Prevalence of TMD signs and diagnoses in individuals with (ID) and without (CG) Intellectual Disability

Variables		ID Group N (%)	Comparative Group N (%)	P value
TMD SIGNS				
Limited mouth opening	Yes	32 (34%)	22 (22.9%)	0.108
	No	62 (66%)	74 (77.1%)	
Deviation	Yes	38 (40.4%)	33 (34.4%)	0.454
	No	56 (59.6%)	63 (65.6%)	
Deflection	Yes	16 (17%)	23 (24%)	0.282
	No	78 (83%)	73 (76%)	
Joint noise	Yes	48 (51.1%)	61 (63.5%)	0.106
	No	46 (48.9%)	35 (36.5%)	
TMD DIAGNOSES				
Myofascial Pain Ia	Yes	15 (16%)	20 (20.8%)	0.456
	No	79 (84%)	76 (79.2%)	
Myofascial Pain with limited opening Ib	Yes	8 (8.4%)	16 (16.7%)	0.125
	No	87 (91.6%)	80 (83.3%)	
DDWR IIa	Yes	11 (12.9%)	28 (29.2%)	**0.011***
	No	74 (87.1%)	68 (70.8%)	
DDWOR IIb	Yes	1 (1.1%)	-	0.492
	No	92 (98.9%)	96 (100%)	
DDWOR IIc	Yes	8 (8.3%)	4 (4.2%)	0.372
	No	88 (91.7%)	92 (95.8%)	
Arthralgia IIIa	Yes	14 (14.9%)	22 (22.9%)	0.175
	No	80 (22.9%)	76 (76%)	
Osteoarthritis IIIb	Yes	-	-	-
	No	95 (100%)	96 (100%)	
Osteoarthrosis IIIc	Yes	4 (4.2%)	1 (1%)	0.368
	No	92 (95.8%)	95 (99%)	
TMD Total	Yes	36 (37.5%)	50 (52.1%)	0.059
	No	60 (62.5%)	46 (47.9%)	

Note: Chi2 test or †Fisher's exact test when cells expected a count less than 5, with significance level of 0.05. *indicate statistical significance.

Gender and Temporomandibular Signs and Diagnosis

There was no significant association between gender and signs of TMD in Intellectual disability group. However, in healthy controls the prevalence of female patients who had limited mouth opening was significantly higher compared with male patients (p=0.006). About TMD diagnosis, also wasn't association with Intellectual disability group. But, in comparative group females showed more myofascial pain (p=0.035), myofascial pain with limited opening (p=0.009) and arthralgia (p=0.002). These data can be seen in Table 3.

Table 3. Gender distribution percentage of TMD signs and diagnoses

		ID Group			Comparative Group			TOTAL		
Variables		**Female N (%)**	**Male N (%)**	**P value**	**FemaleN (%)**	**Male N (%)**	**P value**	**Female N (%)**	**Male N (%)**	**P value**
TMD SIGNS										
Limited mouth opening	Yes	19 (41.3%)	13 (27.1%)	0.192	20 (32.8%)	2 (5.7%)	0.664	39 (36.4%)	15 (18.1%)	**0.006***
	No	27 (58.7%)	35 (72.9%)		41 (67.2%)	33 (94.3%)		68 (63.6%)	68 (81.9%)	
Deviation	Yes	19 (39.6%)	19 (39.6%)	1	22 (36.1%)	11 (31.4%)	0.645	41 (38.3%)	30 (36.1%)	0.765
	No	27 (58.7%)	29 (60.4%)		39 (63.%)	24 (68.6%)		53 (63.9%)	53 (63.9%)	
Deflection	Yes	8 (17.4%)	8 (16.7%)	1	18 (29.5%)	5 (14.3%)	0.136	26 (24.3%)	13 (15.7%)	0.153
	No	38 (82.6%)	40 (83.3%)		43 (70.5%)	30 (85.7%)		81 (75.7%)	70 (84.3%)	
Joint noise	Yes	25 (54.3%)	23 (47.9%)	0.544	41 (67.2%)	20 (57.1%)	0.381	66 (61.7%)	43 (51.8%)	0.186
	No	21 (45.7%)	25 (52.1%)		20 (32.8%)	15 (42.9%)		41 (38.3%)	40 (48.2%)	
TMD DIAGNOSES										
Myofascial Pain Ia	Yes	8 (17%)	7 (14.9%)	1	17 (27.9%)	3 (8.6%)	**0.035***	25 (23.1%)	10 (12.2%)	0.06
	No	39 (83%)	40 (85.1%)		44 (72.1%)	32 (91.4%)		83 (76.9%)	72 (87.8%)	
Myofascial Pain with limited opening Ib	Yes	6 (12.5%)	2 (4.3%)	0.268	15 (24.6%)	1 (2.9%)	**0.009***	21 (19.3%)	3 (3.7%)	**0.002***
	No	42 (87.5%)	45 (95.7%)		46 (75.4%)	34 (97.1%)		88 (80.7%)	79 (96.3%)	
DDWR IIa	Yes	4 (9.5%)	7 (16.3%)	0.520	21 (34.4%)	7 (20%)	0.165	25 (24.3%)	14 (17.9%)	0.363
	No	38 (90.5%)	36 (83.7%)		40 (65.6%)	28 (80%)		78 (75.7%)	64 (82.1%)	
DDWOR IIb	Yes	1 (2.2%)	-	0.484	-	-	-	1 (0.9%)	-	1
	No	44 (97.8%)	48 (100%)		61 (100%)	35 (100%)		105 (99.1%)	83 (100%)	
DDWOR IIc	Yes	4 (8.3%)	4 (8.3%)	1	4 (6.6%)	-	0.293	8 (7.3%)	4 (4.8%)	0.558
	No	44 (91.7%)	44 (91.7%)		57 (93.4%)	35 (100%)		101 (92.7%)	79 (95.2%)	
Arthralgia IIIa	Yes	7 (14.9%)	7 (14.9%)	1	20 (32.8%)	2 (5.7%)	**0.002***	27 (25%)	9 (11%)	**0.016***
	No	40 (85.1%)	40 (85.1%)		41 (67.2%)	33 (94.3%)		81 (75%)	73 (89%)	
Osteoarthritis IIIb	Yes	-	-	-	-	-	-	-	-	-
	No	48 (100%)	48 (100%)		61 (100%)	35 (100%)		108 (100%)	83 (100%)	
Osteoarthrosis IIIc	Yes	3 (6.3%)	1 (2.1%)	0.617	1 (1.6%)	-	1	4 (3.7%)	1 (1.2%)	0.392
	No	45 (93.8%)	47 (97.9%)		60 (98.4%)	35 (100%)		105 (96.3%)	82 (98.8%)	
TMD Total	Yes	19 (39.6%)	17 (35.4%)	0.833	40 (65.6%)	10 (28.6%)	**0.001***	59 (54.1%)	27 (32.5%)	**0.003***
	No	29 (60.4%)	31 (64.6%)		21 (34.4%)	25 (71.4%)		50 (45.9%)	56 (67.5%)	

Note: Chi2 test or †Fisher's exact test when cells expected a count less than 5, with significance level of 0.05. *indicate statistical significance.

Age and Temporomandibular Signs and Diagnosis

In group of people with Intellectual disability there wasn't statistically difference in the prevalence of TMD signs and diagnosis according to age. In the group of healthy control subjects, a significant difference was found in the diagnosis of myofascial pain with opening limitation, where individuals up to 30 years old had a lower prevalence than those aged 31 to 50 years or 50 years or more. These data can be seen in Table 4.

Table 4. Age distribution percentage of TMD signs and diagnoses

Variables		ID Group				Comparative Group				TOTAL			
		≤ 30 years old	31 – 50 years old	≥51 years old	P value	≤ 30 years old	31 – 50 years old	≥51 years old	P value	≤ 30 years old	31 – 50 years old	≥51 years old	P value
TMD SIGNS													
Limited mouth opening	Yes	12 (29.3%)	18 (38.3%)	2 (50%)	0.596	8 (16%)	10 (27%)	4 (44.4%)	0.126	20 (22%)	28 (33.3%)	6 (46.2%)	0.095
	No	29 (70.7%)	29 (61.7%)	2 (50%)		42 (84%)	27 (73%)	5 (55.6%)		71 (78%)	56 (66.7%)	7 (53.8%)	
Deviation	Yes	16 (39%)	21 (44.7%)	-	0.221	17 (34%)	13 (35.1%)	3 (33.3%)	1	33 (36.3%)	34 (40.5%)	3 (23.1%)	0.498
	No	25 (61%)	26 (55.3%)	4 (100%)		33 (66%)	24 (64.9%)	6 (66.7%)		58 (63.7%)	50 (59.5%)	10 (76.9%)	0.221
Deflection	Yes	7 (17.1%)	8 (17%)	1 (25%)	1	8 (16%)	11 (29.7%)	4 (44.4%)	0.096	15 (16.5%)	19 (22.6%)	5 (38.5%)	0.170
	No	34 (82.9%)	39 (83%)	3 (75%)		42 (84%)	26 (70.3%)	5 (55.6%)		76 (83.5%)	65 (77.4%)	8 (61.5%)	
Joint noise	Yes	22 (55%)	23 (47.9%)	2 (50%)	0.819	33 (66%)	22 (59.5%)	6 (66.7%)	0.820	55 (61.1%)	45 (52.9%)	8 (61.5%)	0.526
	No	18 (45%)	25 (52.1%)	2 (50%)		17 (34%)	15 (40.5%)	3 (33.3%)		35 (38.9%)	40 (47.1%)	5 (38.5%)	
TMD DIAGNOSES													
Myofascial Pain Ia	Yes	4 (9.5%)	10 (21.7%)	1 (25%)	0.257	11 (22%)	8 (21.6%)	1 (11.1%)	0.818	15 (16.3%)	18 (21.7%)	2 (15.4%)	0.675
	No	38 (90.5%)	36 (78.3%)	3 (75%)		39 (78%)	29 (78.4%)	8 (88.9%)		77 (83.7%)	65 (78.3%)	11 (84.6%)	
Myofascial Pain with limited opening Ib	Yes	2 (4.7%)	5 (10.9%)	1 (25%)	0.257	3 (6%)[a]	9 (24.3%)[b]	4 (44.4%)[b]	**0.009***	5 (5.4%)[a]	14 (16.9%)[b]	5 (38.5%)[b]	**0.003***
	No	41 (95.3%)	41 (89.1%)	3 (75%)		47 (94%)	28 (75.7%)	5 (55.6%)		88 (94.6%)	69 (83.1%)	8 (61.5%)	
DDWR IIa	Yes	5 (12.5%)	6 (15.4%)	-	0.769	15 (30%)	11 (29.7%)	2 (22.2%)	0.898	20 (22.2%)	17 (22.4%)	2 (15.4%)	0.889
	No	35 (87.5%)	33 (84.6%)	4 (100%)		35 (70%)	26 (70.3%)	7 (77.8%)		70 (77.8%)	59 (77.6%)	11 (84.6%)	
DDWOR IIb	Yes	1 (2.4%)	-	-	0.505	-	-	-	-	1 (1.1%)	-	-	1
	No	41 (97.%)	45 (100%)	4 (100%)		50 (100%)	37 (100%)	9 (100%)		91 (98.9%)	82 (100%)	13 (100%)	
DDWOR IIc	Yes	1 (2.3%)	7 (14.9%)	-	0.091	2 (4%)	1 (2.7%)	1 (11.1%)	0.536	3 (3.2%)	8 (9.5%)	1 (7.7%)	0.195
	No	42 (97.7%)	40 (85.1%)	4 (100%)		48 (96%)	36 (97.3%)	8 (88.9%)		90 (96.8%)	76 (90.5%)	12 (92.3%)	
Arthralgia IIIa	Yes	3 (7.1%)	11 (23.9%)	-	0.059	8 (16%)	11 (29.7%)	3 (33.3%)	0.299	11 (12%)[a]	22 (26.5%)[b]	3 (23.1%)	**0.047***
	No	39 (92.9%)	35 (76.1%)	4 (100%)		42 (84%)	26 (70.3%)	6 (66.7%)		81 (88%)	61 (73.5%)	10 (76.9%)	
Osteoarthritis IIIb	Yes	-	-	-	-	-	-	-	-	-	-	-	-
	No	42 (100%)	47 (100%)	4 (100%)		50 (100%)	37 (100%)	9 (100%)		92 (100%)	84 (100%)	13 (100%)	
Osteoarthrosis IIIc	Yes	1 (2.3%)	2 (4.3%)	1 (25%)	0.203	-	-	1 (11.1%)	0.094	1 (1.1%)[a]	2 (2.4%)	2 (15.4%)[b]	**0.024***
	No	42 (97.7%)	45 (95.7%)	3 (75%)		50 (100%)	37 (100%)	8 (88.9%)		92 (98.9%)	82 (97.6%)	11 (84.6%)	
TMD Total	Yes	12 (27.9%)	23 (48.9%)	1 (25%)	0.094	23 (46%)	21 (56.8%)	6 (66.7%)	0.407	35 (37.6%)	44 (52.4%)	7 (53.8%)	0.121
	No	31 (72.1%)	31 (51.1%)	3 (75%)		27 (54%)	16 (43.2%)	3 (33.3%)		58 (62.4%)	40 (47.6%)	6 (46.2%)	

Note: Chi2 test or †Fisher's exact test when cells expected a count less than 5, with significance level of 0.05. *statistical significance. Superscript letters indicate statistically significant differences between groups.

DISCUSSION

The main objective of this research was assessing the prevalence of TMD signs and symptoms in adults with and without ID. Our hypothesis was that the group of people with ID would present more TMD signs and diagnoses, however our findings suggest that group with ID are affected by TMD signs and diagnoses similarly to the comparative group. In this sense, the difference with statistical significance found was related to the diagnosis of disk displacement with reduction, with the comparison group presenting more affected. Until today, only two studies have investigated the prevalence of TMD signs in people with ID[12,20]. To the best of our knowledge, this is the first study to assess the prevalence of TMD diagnoses in people with ID.

One of the studies that investigated the prevalence of TMD signs in people with ID was conducted by Gurbuz et al.[12]. They investigated the prevalence of TMD signs in a group of hospitalized patients with ID and in a control group of health patients. Although this study used the same diagnostic criteria as those adopted in our study, the results were different. Gurbuz reports that the ID population was significantly more affected by TMD signs – specifically for mouth opening limitation, deflection and bilateral joint noise, while our study found no statistically significant differences in the prevalence of TMD signs between the groups of adults with and without ID. We believe we have found this discrepancy in the findings due to the different populations studied, while Gurbuz studied a group of hospitalized ID patients, we studied a healthy ID population in an educational institution. Gurbuz's et al.[12] study population may have higher levels of TMD signs due to single or combined effects of drugs, mental status, and emotional stress as a result of prolonged hospitalization. To confirm this hypothesis further studies investigating the relationship of TMD in different population groups of people with ID should be conducted.

Tanboga et al.[20] also investigated the prevalence of TMD signs in a population of patients with and without ID. The group studied included a group of young Olympic athletes with ID and a comparison group of healthy adolescents. It was found a significantly higher prevalence of TMJ noises, maximum vertical opening, headaches among athletes with ID compared to the healthy control group. To date, there is no agreement in the literature that professional athletes constitute a risk group for temporomandibular disorders[21]. Therefore, attributing the higher prevalence of TMD signs found in the group of athletes studied by Tanboga to the fact that they have ID may be mistaken, since being a professional athlete may be a risk factor for higher prevalence of TMD signs and symptoms. A study with a comparison group of athletes with and without ID would be necessary to answer this question. Therefore, once again we attribute the difference in results between our study and Tanboga's due to the specific characteristics of the samples studied.

Different epidemiological studies show that chronic pain is more prevalent in female than in male[22]. Nahin's study showed that a higher proportion of women compared to men reported any pain in the past three months[23]. Also, the majority of studies in patients with TMD reported a higher frequency of TMD in female patients[24]. However, our results suggest that there aren't significant differences in diagnosis or signs of TMD between female and male in the ID group. In the comparison group, on the other hand, females presented significantly more prevalence of diagnosis in TMD, specifically for disc displacement with reduction, arthralgia and Total TMD than males, but there were also no for the TMD signs.

It has been suggested that an interaction of biological, psychological, and sociocultural factors likely contribute to differences in pain perception between males and females[25]. Among the biological factors attributed to differences in pain perception, sex hormones exert a great influence[25], in part this is due to the distribution of sex hormones and their receptors in areas of the peripheral and central nervous system associated with nociceptive transmission[26]. Special attention should be given to those related to the menstrual cycle[27], where evidence suggests that women in the luteal phase have greater pain sensitivity[28]. A part of women with intellectual disabilities may present irregularities in the menstrual cycle or even amenorrhea. Furthermore,

drug groups such as anticonvulsants and antipsychotics frequently used by women with ID are associated with menstrual irregularitie[29]. To our knowledge, no study has tried to understand the different mechanisms of pain in people with ID, further research is needed before firm conclusions can be drawn regarding hormonal influences on females with ID.

There are also different psychosocial mechanisms that seem to play a key role in the gender-related differences in pain in people without ID[25]. Such as, while male tend to use behavioural distraction and problem-focused tactics to manage pain, female tend to use a range of coping techniques including social support, positive self-statements, emotion-focused techniques, cognitive reinterpretation, and attentional focus[25,26]. We hypothesize that these differences do not occur for individuals with ID, or that they occur in an attenuated manner. It is believed that sociocultural differences in femininity and masculinity seem to play an important role in pain responses between the sexes, since the expression of pain is generally more socially acceptable among women. This is associated with an effect that can lead to biased reports of pain[25]. It is possible that this stereotype of pain between the sex is attenuated in individuals with ID. It is important to note that the two studies previously conducted with people with ID also found no significant association between TMD signs and gender[10,20]. This fact corroborates the perceptions discussed here in relation to the biopsychosocial factors that influence the prevalence of chronic diseases and that need to be further studied in individuals with intellectual disabilities.

Different studies have investigated age-related changes in pain severity and impact[30]. Evidence suggests that older adults show less sensitivity to brief, cutaneous pain, yet show greater sensitivity to more sustained pain with stimuli that impact tissue more deeply, especially related to chronic pain[31]. In our study, no significant associations were found regarding TMD signs and age. Regarding diagnoses, significant differences occurred only in the comparison group, where young individuals had less myofascial pain with limitation when compared to older ones.

The main limitations of this study are related to the difficulty in obtaining reliable answers regarding TMD in the group with ID. In an attempt to overcome this obstacle, adaptations to the RDC/TMD index were performed, using the UPAT scale. It has already been previously used in the study of orofacial pain in populations with some degree of dementia, presenting a certain degree of reliability. Another limitation is the fact of this result could be related to the specific sample of the study and may not represent the entire population. The participants comprising the comparation group were the patients admitted to the dental clinic of the University for dental examination or treatment. It is possible that some of the subjective and objective findings were because of orofacial disorders rather than a temporomandibular disorder. This would result in an overestimation of the prevalence of TMD signs.

This study showed that the group of people with ID are as affected as the comparison group by TMD, which highlights the need to be aware of this disease when caring for people with ID, in addition we observed that the difference between genders traditionally found for TMD is not seen in this population and in this context the need for further studies investigating this occurrence arises.

CONCLUSION

This study revealed that adults with intellectual disabilities (ID) have a similar prevalence of signs and symptoms of temporomandibular dysfunction (TMD) to adults without ID. The gender differences traditionally observed in TMD diagnoses were not evident in the ID group, suggesting that personalized care approaches are needed for this population. The findings highlight the importance of careful and ongoing assessment of TMD in individuals with ID, reinforcing the need for further research to better understand the factors contributing to these differences.

AUTHORS' CONTRIBUTIONS

Yasmine Mendes Pupo: data collect and wrinting.

Giselle Emilãine da Silva Reis: data collect and wrinting.
Jullyana Mayara Preizner Dezanetti: data collect.
Marina Fanderuff: data collect.
Thábata Louise Schossler: data collect.
Ricardo Rasmussen Petterle: statistical analysis.
Amanda Kerin Alves Cavalheiro: revision of the manuscript.
Daniel Bonotto: revision of the manuscript.
Cassius Carvalho Torres-Pereira: revision of the manuscript.
Priscila Brenner Hilgenberg-Sydney: revision of the manuscript.

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CONFLICTS OF INTERESTS

The authors declare no conflicts of interest.

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