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Revision articles

Profile of scientific production of obstructive sleep apnea in interface of speech and language pathology

Perfil da produção científica da apneia obstrutiva do sono na interface da fonoaudiologia

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ABSTRACT

The purpose of this study was to investigate the scientific production of Speech-Language Pathology and Audiology at the interface with Obstructive Sleep Apnea, considering impact factor, level of evidence and corresponding area of the Speech-Language Pathology and Audiology. A literature search was performed in databases Lilacs, PubMed and Scopus, through the intersection of keywords and specific free terms of Speech-Language Pathology and Audiology and "Sleep Apnea, Obstructive". For the article would be included in this study, needed to approach as the main axis the Speech-Language Pathologist acting in patients with Obstructive Sleep Apnea. Were held a consultation on the WebQualis CAPES, investigating specific journals of Speech-Language Pathology and Audiology of Area 21 and their respective Qualis. Selected articles were analyzed for impact factor, level of evidence and area of the corresponding Speech-Language Pathology and Audiology. Were located 983 articles, being selected 39, originated mainly from Scopus. The prevalent was the Qualis B1, with an average impact factor of 3,49; higher number of publications of 2006, level of evidence 5 and the Speech-Language Pathology and Audiology prevalent area was the Orofacial Myology. The analysis of the scientific production of Speech-Language Pathology and Audiology was performed at the interface with Obstructive Sleep Apnea, verifying that the Orofacial Myology and the evidence level 5 predominated in this context.

Keywords: Speech, Language and Hearing Sciences; Sleep Apnea, Obstructive; Impact Factor; Interdisciplinary Research; Evidence-Based Practice

RESUMO

Este estudo teve por objetivo averiguar a produção científica da Fonoaudiologia na interface com Apneia Obstrutiva do Sono, considerando fator de impacto, nível de evidência e área da Fonoaudiologia correspondente. Foi realizada uma busca na literatura nas bases de dados Lilacs, PubMed e Scopus, por meio do cruzamento das palavras-chave e termos livres específicos da Fonoaudiologia com "Apneia do Sono Tipo Obstrutiva". Para que o artigo fosse incluído no presente estudo, necessitava abordar como eixo principal da atuação fonoaudiológica nos pacientes com a Apneia Obstrutiva do Sono. Realizou-se uma consulta ao WebQualis da CAPES, investigando periódicos específicos da Fonoaudiologia da área 21 e seu respectivo Qualis. Os artigos selecionados foram analisados quanto ao fator de impacto, nível de evidência e área da Fonoaudiologia correspondente. Foram localizados 983 artigos, sendo selecionados 39, originados principalmente da base Scopus. O Qualis prevalente foi o B1, fator de impacto com média de 3.49, maior volume de publicações a partir do ano de 2006, nível de evidência 5 e área de atuação fonoaudiológica na maioria foi a Motricidade Orofacial. Foi realizada a análise da produção científica da Fonoaudiologia na interface com Apneia Obstrutiva do Sono, verificando-se que a Motricidade Orofacial e o nível de evidência 5 predominaram neste âmbito.

Descritores: Fonoaudiologia; Apneia do Sono Tipo Obstrutiva; Fator de Impacto; Pesquisa Interdisciplinar; Prática Clínica Baseada em Evidências

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INTRODUCTION

The consequences of obstructive sleep apnea (OSA) influence the general health of the individual, e.g. in cardiovascular disorders[1,2] and cerebrovascular accident[3], besides the direct implications on communication processes and disorders, especially in the fields of work of Speech-Language Pathology.

For example, it may be associated with hearing aspects, such as reduced amplitude of P300[4], sensorineural hearing loss[5] and auditory processing disorders in children[6] (AUDIOLOGY); signs of swallowing disorder[7,8] (DYSPHAGIA); association with work accidents[9] (OCCUPATIONAL SPEECH-LANGUAGE PATHOLOGY) and learning and memory alterations[10] (EDUCATIONAL SPEECH-LANGUAGE PATHOLOGY). Individuals with OSA present higher risk of cerebrovascular accident[3] (NEUROFUNCTIONAL SPEECH-LANGUAGE PATHOLOGY), and OSA is more frequent with aging[11] (GERONTOLOGY). It is also associated with changes in performance in language levels[12,13] (LANGUAGE), alterations in oropharyngeal muscle tone[14,15] (OROFACIAL MYOLOGY), neurocognitive disorders in children (NEUROPSYCHOLOGY)[16] and differences in acoustic voice parameters[17,18] (VOICE). Considering all these aspects, Speech-Language Pathology should also be involved in training programs for behavioral changes, favoring a better quality of sleep[19] (COMMUNITY HEALTH).

These findings of scientific publications justify the action of Speech-Language Pathology in OSA, as well as the need of further investigations to elucidate the scope of such publications in scientific journals.

This production of knowledge is fundamental for the advancement of science and an important opportunity to diffuse and enhance the scientific findings[20].

This, this study analyzed the scientific production of Speech-Language Pathology in its interface with obstructive sleep apnea, considering the impact factor, level of evidence and corresponding specialty within Speech-Language Pathology.

METHODS

A literature search was performed on the databases Lilacs, PubMed and Scopus, crossing the DeCS/MeSH keywords: “Sleep Apnea, Obstructive” (1), “Speech, Language and Hearing Sciences” (2), “Audiology” (3), “Language” (4), “Voice” (5), “Speech Therapy” (6), “Geriatrics” (7), “Public Health” (8) and “Deglutition Disorders” (9). Aiming at the comprehensive action of Speech-Language Pathology, the following free terms were also employed: Oropharyngeal exercises (10), Occupational Speech-Language Pathology (11), Educational Speech-Language Pathology (12), Neurofunctional Speech-Language Pathology (13). All keywords and free terms were used both in Portuguese and English. This generated 12 search strategies, as described in Figure 1.

Further three searches were performed using the keywords (1) AND mastication, AND speech and AND swallowing, yet no further papers related to the issue were found, thus these were not considered.

Papers were included in the study if their main focus was the role of Speech-Language Pathology on the clinical presentation of OSA.

The following exclusion criteria were considered: studies specific of other procedures (surgery, dental treatment, drug therapy, CPAP); studies whose main focus was the development/evaluation of questionnaires on quality of life; investigations addressing other genetic syndromes (Down, craniosynostosis and velocardiofacial syndromes); editorials and letter to the editor. The search was conducted using the VPN system (Virtual Private Network), and papers whose full texts were not available were also excluded.

The references of included papers were also analyzed, so that any study not identified on the databases could also be analyzed and added in the study, in case it met the inclusion criteria.

The Qualis classification of journals was checked by assessing the full list of journals on the website WebQualis of the Coordination for the Improvement of Higher Education Personnel (CAPES), which consisted of 4,524 pages[21]. Searching only for journals of the “PHYSICAL EDUCATION” area and considering specific journals of Speech-Language Pathology, the journals were considered if their title included one of the following words, either in Portuguese, English or Spanish:

- Speech-Language Pathology
- Communication/Communicate/Communications
- Language
- Disfluency
- Speech
- Aphasia
- Orofacial Myology
- Dysphagia
- Audiology
- Hearing
- Deafness

SEARCH STRATEGIES		
A	(1) AND (2)	"Apneia do Sono Tipo Obstrutiva" AND "Fonoaudiologia" "Sleep Apnea, Obstructive" AND "Speech, Language and Hearing Sciences"
B	(1) AND (3)	"Apneia do Sono Tipo Obstrutiva" AND "Audiologia" "Sleep Apnea, Obstructive" AND "Audiology"
C	(1) AND (4)	"Apneia do Sono Tipo Obstrutiva" AND "Linguagem" "Sleep Apnea, Obstructive" AND "Language"
D	(1) AND (5)	"Apneia do Sono Tipo Obstrutiva" AND "Voz" "Sleep Apnea, Obstructive" AND "Voice"
E	(1) AND (6)	"Apneia do Sono Tipo Obstrutiva" AND "Fonoterapia" "Sleep Apnea, Obstructive" AND "Speech Therapy"
F	(1) AND (7) AND (2)	"Apneia do Sono Tipo Obstrutiva" AND "Geriatria" AND Fonoaudiologia "Sleep Apnea, Obstructive" AND "Geriatrics" AND "Speech, Language and Hearing Sciences"
G	(1) AND (8) AND (2)	"Apneia do Sono Tipo Obstrutiva" AND "Saúde Pública" AND "Fonoaudiologia" "Sleep Apnea, Obstructive" AND "Public Health" AND "Speech, Language and Hearing Sciences"
H	(1) AND (9)	"Apneia do Sono Tipo Obstrutiva" AND "Transtornos da Deglutição" "Sleep Apnea, Obstructive" AND "Deglutition Disorders"
I	(1) AND (10)	"Apneia do Sono Tipo Obstrutiva" AND Exercícios Orofaríngeos "Sleep Apnea, Obstructive" AND Oropharyngeal Exercises
J	(1) AND (11)	"Apneia do Sono Tipo Obstrutiva" AND Fonoaudiologia do Trabalho "Sleep Apnea, Obstructive" AND Occupational Speech
K	(1) AND (12)	"Apneia do Sono Tipo Obstrutiva" AND Fonoaudiologia Educacional "Sleep Apnea, Obstructive" AND Educacional Speech
L	(1) AND (13)	"Apneia do Sono Tipo Obstrutiva" AND Fonoaudiologia Neurofuncional "Sleep Apnea, Obstructive" AND Neurofunctional Speech

Legend: Terms between " ": keywords listed in DeCS/MeSH

Figure 1. Search strategies employed by crossing DeCS/MeSH keywords and free terms, specific of the field under study

- Noise
- Tinnitus
- Voice

In case the journal titles were acronyms, their websites were searched to investigate if the publications actually focused on Speech-Language Pathology. Thus, Figure 2 presents the list with ISSN, journal name and Qualis CAPES, of journals considered specific of Speech-Language Pathology (the list was accessed on July 2015).

The impact factor was also analyzed, which is considered an instrument to evaluate the quality of journals[22]. The impact factor was searched on September 2015 on the website http://www.citefactor.org/, searching all journals of included references.

The papers were initially selected by reading the titles and abstracts. Following, the selected papers were analyzed as to the journal, year of publication, title, specialty within Speech-Language Pathology, type of study, and level of evidence, in which the lowest was scored as 1 and the highest as 10, according to the study design[23].

Each paper was also classified in one or more specialties of Speech-Language Pathology addressed, among the 11 specialties, as described in Figure 3[24].

Data were analyzed in characterizer mode, using descriptive and inductive statistics and Spearman correlation ($p<0.05$), analyzing the relationship between:

- Qualis and year of publication
- Qualis and level of evidence

Year and level of evidence

	ISSN	Journal	Qualis CAPES
01	1420-3030	Audiology & Neuro-Otology (Print)	A1
02	0093-934X	Brain and Language	A1
03	0196-0202	Ear and Hearing (Print)	A1
04	0378-5955	Hearing Research	A1
05	1499-2027	International Journal of Audiology	A1
06	1368-2822	International Journal of Language and Communication Disorders (Print)	A1
07	0094-730X	Journal of Fluency Disorders	A1
08	1092-4388	Journal of Speech, Language, and Hearing Research (Print)	A1
09	0002-726X	American Annals of the Deaf (Washington, D.C. 1886. Print)	A2
10	0268-7038	Aphasiology (London)	A2
11	0179-051X	Dysphagia (New York. Print)	A2
12	1754-9507	International Journal of Speech-Language Pathology (Print)	A2
13	0021-9924	Journal of Communication Disorders	A2
14	0892-1997	Journal of Voice	A2
15	1463-1741	Noise & Health	A2
16	0104-5687	Pró-Fono (Impresso)	A2
17	2179-6491	Sociedade Brasileira de Fonoaudiologia. Jornal	A2
18	1651-386X	Audiological Medicine	B1
19	1516-1846	Revista CEFAC (Impresso)	B1
20	1516-8034	Revista da Sociedade Brasileira de Fonoaudiologia (Impresso)	B1
21	1982-0232	Revista da Sociedade Brasileira de Fonoaudiologia (On-line)	B1
22	0214-4603	Revista de Logopedia, Foniatría y Audiología (Ed. Impresa)	B1
23	0745-7472	The Hearing Journal	B1
24	0735-0120	The International Journal of Orofacial Myology	B1
25	0946-5448	The International Tinnitus Journal	B1
26	0102-762X	Distúrbios da Comunicação	B2
27	2176-2724	Distúrbios da Comunicação	B2
28	1535-2609	Audiology Today	B3
29	1074-5734	The Hearing Review	B3
30	1657-723X	Audiologia Hoy	B4
31	1313-1400	Bulgarian Journal of Communication Disorders	B4
32	1647-3485	Cadernos de Comunicação e Linguagem	B4
33	1668-9402	Fonoaudiológica (Buenos Aires)	B4
34	1735-045X	Iranian Audiology	B4
35	2236-9740	Journal of Speech Sciences	B4
36	1415-1928	Linguagem & Ensino (UCPel. Impresso)	B4
37	1696-1544	Logopédia Revista del Col-legi de Logopedes de Catalunya	B4
38	1370-706X	Logopedie: informatiemedium van de Vlaamse Vereniging voor Logopedisten	B4
39	1679-3048	Revista da Fonoaudiologia (CRFa/SP)	B4
40	0718-4891	Revista de Fonoaudiología - Universidad de Valparaíso	B4
41	1807-9040	Revista Fonoaudiologia Brasil (Online)	B4
42	0104-8481	Comunicações (UNIMEP)	B5
43	1807-3115	Anais (Congresso Brasileiro de Fonoaudiologia)	C
44	1021-7762	Folia Phoniatrica et Logopaedica	C
45	1421-9972	Folia Phoniatrica et Logopaedica (Online)	C
46	1806-6151	PET Informa (FOB / USP)	C
47	2179-0841	Revista da Sociedade Brasileira de Fonoaudiologia - Suplemento	C

Figure 2. Scientific journals with respective ISSN, title and Qualis CAPES, considered specific of Speech-Language Pathology

Figure 3. Fields of Speech-Language Pathology assigned for selected papers

LITERATURE REVIEW

By the strategies adopted to search the databases, 10 papers were found in Lilacs, 598 in PubMed and 375 in Scopus. Table 1 describes this result, highlighting that repeated papers found in different databases are included, as well as repetition of strategies in different searches.

Figure 4 presents the specific relationship of main focus of studies that were excluded, according to the exclusion criteria.

Table 2 displays the analysis of papers selected for the study. It also presents the scoring of the level of evidence, in which the lowest was scored as 1 and the highest as 10, according to the study design[23].

Table 1. Number of papers found and selected in databases Lilacs, PubMed and Scopus, for each search strategy

Strategy	Lilacs (total n)	Lilacs (selected n)	PubMed (total n)	PubMed (selected n)	Scopus (total n)	Scopus (selected n)
A	4	3	6	0	2	2
B	0	0	5	0	7	2
C	0	0	185	3	153	6
D	0	0	64	3	85	7
E	3	3	43	3	57	4
F	0	0	0	0	1	0
G	0	0	18	2	0	0
H	0	0	264	2	64	4
I	3	2	7	5	5	3
J	0	0	4	0	1	0
K	0	0	1	0	0	0
L	0	0	1	0	0	0

SEARCH STRATEGY		SPECIFIC REASON FOR EXCLUSIONS
A	"Speech-Language Pathology"	Focus on aspects not related with Speech-Language Pathology: Down syndrome
B	"Audiology"	Focus on aspects not related with Speech-Language Pathology: Microcephaly; mucopolysaccharidosis; mitochondrial cytopathies Treatment: uvulopalatopharyngoplasty
C	"Language"	Focus on aspects not related with Speech-Language Pathology: Parkinson disease; cleft lip and palate, Down syndrome; diabetes mellitus; pulmonary chronic disease; Alice in Wonderland syndrome; Cervical spine diseases; Cancer; metabolic syndrome. Validation/translation of questionnaires on quality of sleep. Treatments: pharyngeal surgeries; tracheostomy; tongue suspension; maxillomandibular advancement; adenotonsillectomy; mandibular distraction; CPAP.
D	"Voice"	Focus on aspects not related with Speech-Language Pathology: vocal fold paralysis; malformation of the upper airway; Lung disease; type II mucopolysaccharidosis; cleft lip and palate; cancer; Charcot-Marie-Tooth disease; laryngeal sarcoidosis; diffuse idiopathic skeletal hyperostosis Treatments: utilization of CPAP, adenotonsillectomy; uvulopalatopharyngoplasty; pharyngoplasty
E	"Speech Therapy"	Focus on aspects not related with Speech-Language Pathology: Microcephaly; Prader-Willi syndrome; Down syndrome; ataxias; metabolic syndrome; cancer. Treatments: pharyngoplasty; hyoid bone repositioning; adenotonsillectomy; utilization of CPAP; rapid maxillary expansion; tracheostomy.
F	"Gerontology"	*
G	"Community Health"	Not specific of the issue under study
H	"Swallowing Disorders"	Focus on aspects not related with Speech-Language Pathology: Macroglossia; micrognathia; Prader-Willi syndrome; chronic pulmonary disease; obesity; Robin sequence; cancer; asthma; inflammation of the upper airway. Treatments: uvulopalatopharyngoplasty; utilization of CPAP; adenotonsillectomy; tongue base reduction.
I	Oropharyngeal exercises	Effects of mandibular distraction
J	Occupational Speech-Language Pathology	Not specific of the issue under study
K	Educational Speech-Language Pathology	*
L	Neurofunctional Speech-Language Pathology	*

Legend: (*): no papers were found

Figure 4. Focus of excluded studies, according to the exclusion criteria, for each search strategy

Table 2. Information on the journal, author, title year, type of study, level of evidence and specialty of Speech-Language Pathology of papers considered in the present study

Journal (ISSN)	Qualis for area 21 (journal specific of Speech-Language Pathology or Interdisciplinary)	Impact factor (IF)	Indexing	Author, year	Title	Type of study	Level of evidence	Specialty of Speech-Language Pathology
Acta Medica (Hradec Kralove) (12114286)	(NQ) Interdisciplinary	*No IF*	Tracked in references	Šujanská et al, 2015	Surgical and non-surgical therapy of obstructive sleep apnea syndrome in children	Non-systematic literature review	1	Orofacial Myology
American Journal of Respiratory and Critical Care Medicine (1073-449X)	A1 Interdisciplinary	11.986	PubMed, Scopus	Guimarães et al, 2009	Effects of oropharyngeal exercises on patients with moderate obstructive sleep apnea syndrome	Randomized clinical trial	8	Orofacial Myology
Applied Soft Computing (1568-4946)	(*) Interdisciplinary	2.679	Scopus	Solé-Casals et al, 2014	Detection of severe obstructive sleep apnea through voice analysis	Observational study (cross-sectional)	5	Voice
Arch Otolaryngology and Head and Neck Surgery (0194-5998)	B1 Interdisciplinary	1.748	Tracked in references	Jau-Jiuan et al, 2012	Association between obstructive sleep apnea and sudden sensorineural hearing loss: a population-based case-control study	Case-control study	6	Audiology
Archives of Clinical Neuropsychology (0887-6177)	B1 Interdisciplinary	1.921	Scopus	Andreou, Agapitou, 2007	Reduced language abilities in adolescents who snore	Observational study (cross-sectional)	5	Language
Arquivos de Neuro-Psiquiatria (1678-4227)	B1 Interdisciplinary	1.006	Tracked in references	Valbuza et al, 2008	Methods to increase muscle tonus of upper airway to treat snoring: systematic review	Systematic review with meta-analysis of randomized clinical trials	10	Orofacial Myology
Chest (0012-3692)	A1 Interdisciplinary	7.132	PubMed	Ieto et al, 2015	Effects of oropharyngeal exercises on snoring: a randomized trial	Randomized clinical trial	8	Orofacial Myology
			PubMed, Scopus	Fiz et al, 1993	Acoustic analysis of vowel emission in obstructive sleep apnea	Observational study (cross-sectional)	5	Voice
			PubMed	Monoson, Fox, 1987	Preliminary observation of speech disorder in obstructive and mixed sleep apnea	Case report	4	Gerontology / Neurofunctional Speech-Language Pathology
Clinical Linguistics and Phonetics (0269-9206)	B1 Interdisciplinary	0.78	PubMed, Scopus	Lundeborg et al, 2009	Phonological development in children with obstructive sleep-disordered breathing	Observational study (longitudinal)	5	Language
Computer Speech & Language (0885-2308)	(*) Interdisciplinary	1.812	Scopus	Benavidesa et al, 2014	Analysis of voice features related to obstructive sleep apnoea and their application in diagnosis support	Observational study (cross-sectional)	5	Voice
Distúrbios da Comunicação (102-762X)	B2 Speech-Language Pathology	*No IF*	Lilacs	Kronbauer et al, 2013	Propostas fonoaudiológicas ao paciente roncador	Case report	4	Orofacial Myology

Journal (ISSN)	Qualis for area 21 (journal specific of Speech-Language Pathology or Interdisciplinary)	Impact factor (IF)	Indexing	Author, year	Title	Type of study	Level of evidence	Specialty of Speech-Language Pathology
Eurasip Journal on Advances in Signal Processing (1687-6180)	(*) Interdisciplinary	0.808	Scopus	Pozo et al, 2009	Assessment of Severe Apnoea through Voice Analysis, Automatic Speech, and Speaker Recognition Techniques	Observational study (cross-sectional)	5	Voice
International Archives of Otorhinolaryngology (1809-4856)	B1 Interdisciplinary	*No IF*	PubMed, Scopus	Corrêa et al, 2015	Health Promotion in Obstructive Sleep Apnea Syndrome	Non-systematic literature review	1	Community Health
			Lilacs	Pitta et al, 2007	Oral myofunctional therapy applied on two cases of severe obstructive sleep apnea	Case report	4	Orofacial Myology
International Journal of Pediatric Otorhinolaryngology (0165-5876)	B1 Interdisciplinary	1.319	Scopus	Kurnatowski et al, 2006	Neurocognitive abilities in children with adenotonsillar hypertrophy	Observational study (cross-sectional)	5	Neuropsychology
Journal of Clinical and Experimental Neuropsychology (1744-411X)	(*) Interdisciplinary	2.158	PubMed	Salorio et al, 2002	Learning, memory, and executive control in individuals with obstructive sleep apnea syndrome	Observational study (cross-sectional)	5	Language
Journal of Voice (0892-1997)	A2 Speech-Language Pathology	0.944	PubMed, Scopus	Montero Benavides et al, 2015	Formant Frequencies and Bandwidths in Relation to Clinical Variables in an Obstructive Sleep Apnea Population	Observational study (cross-sectional)	5	Voice
Laryngoscope (0023-852X)	A2 Interdisciplinary	2.032	Scopus	Hara et al, 2006	Acoustic analysis of snoring sounds by a multidimensional voice program	Observational study (cross-sectional)	5	Voice
Neurotherapeutics (1933-7213)	(*) Interdisciplinary	3.883	PubMed	De Dios, Brass, 2012	New and unconventional treatments for obstructive sleep apnea	Non-systematic literature review	1	Orofacial Myology
Pan Arab Journal of Neurosurgery (1319-6995)	(NQ) Interdisciplinary	*No IF*	Tracked in references	Baz et al, 2012	The role of oral myofunctional therapy in managing patients with mild to moderate obstructive sleep apnea	Case series	4	Orofacial Myology
Pediatrics (0031-4005)	A1 Interdisciplinary	5.297	Scopus	O'Brien et al, 2004	Neurobehavioral implications of habitual snoring in children	Observational study (cross-sectional)	5	Neuropsychology
Pediatric Neurology (0887-8994)	(*) Interdisciplinary	1.504	PubMed, Scopus	Caspari et al, 2008	Obstructive Sleep Apnea, Seizures, and Childhood Apraxia of Speech	Observational study (longitudinal)	5	Language / Orofacial Myology
Rehabilitacion (0048-7120)	B3 Interdisciplinary	0.946	Lilacs, Scopus	Rangel-León et al, 2015	Rehabilitación de músculos orofaríngeos con ejercicios y electroterapia para el síndrome de apnea-hipoapnea obstructiva del sueño	Case series	4	Orofacial Myology
Respirology (1323-7799)	Interdisciplinary	3.495	PubMed	Bucks, 2013	Neurocognitive function in obstructive sleep apnoea: a meta-review	Systematic review with meta-analysis	9	Neurofunctional Speech-Language Pathology
Revista Brasileira de Otorrinolaringologia (0034-7299)	A2 Interdisciplinary	*No IF*	Scopus	Ziliotto et al, 2006	Avaliação do processamento auditivo em crianças com síndrome da apnéia/hipopnéia obstrutiva do sono	Observational study (cross-sectional)	5	Audiology

Journal (ISSN)	Qualis for area 21 (journal specific of Speech-Language Pathology or Interdisciplinary)	Impact factor (IF)	Indexing	Author, year	Title	Type of study	Level of evidence	Specialty of Speech-Language Pathology
Revista CEFAC (1982-0216)	B1 Speech-Language Pathology	*No IF*	Lilacs	Matsumura et al, 2014.	A percepção do acompanhante e do indivíduo com ronco/saos antes e após fonoterapia	Observational study (longitudinal)	5	Orofacial Myology
			Lilacs	Soares et al, 2010	Fonoaudiologia X ronco/ apneia do sono	Non-systematic literature review	1	Orofacial Myology
			Lilacs	Rosa et al, 2010	Fonoaudiologia e apneia do sono: uma revisão	Non-systematic literature review	1	Orofacial Myology
			Lilacs	Landa et al, 2009	Síndrome da apneia e hipoapneia obstrutiva do sono e o enfoque fonoaudiológico: revisão de literatura	Non-systematic literature review	1	Orofacial Myology
			Tracked in references	Silva et al, 2007	Atuação fonoaudiológica na síndrome da apnéia e hipopnéia obstrutiva do sono: relato de caso	Case report	4	Orofacial Myology
Revista medico-chirurgicala a Societatii de Medici si Naturalisti din Iasi (0300-8738)	(NQ) Interdisciplinary	*No IF*	PubMed, Scopus	Cernomaz et al, 2010	Obstructive sleep apnea patients voice analysis	Observational study (cross-sectional)	5	Voice
Sleep (0161-8105)	A1 Interdisciplinary	5.062	Tracked in references	Camacho et al, 2015	Myofunctional therapy to treat obstructive sleep apnea: a systematic review and meta-analysis	Systematic review with meta-analysis	9	Orofacial Myology
			PubMed	Aaronson et al, 2014	Obstructive Sleep Apnea is Related to Impaired Cognitive and Functional Status After Stroke	Case-control	6	Neurofunctional Speech-Language Pathology
Sleep & Breathing (1520-9512)	B1 Interdisciplinary	2.869	PubMed	Villa et al, 2015	Oropharyngeal exercises to reduce symptoms of OSA after AT	Observational study (longitudinal)	5	Orofacial Myology
			Tracked in references	Valbuza et al, 2010	Methods for increasing upper airway muscle tonus in treating obstructive sleep apnea: systematic review	Systematic review with meta-analysis of randomized clinical trials	10	Orofacial Myology
Sleep Medicine (1389-9457)	A2 Interdisciplinary	3.1	PubMed, Scopus	Diaferia et al, 2013	Effect of speech therapy as adjunct treatment to continuous positive airway pressure on the quality of life of patients with obstructive sleep apnea	Randomized clinical trial	4	Orofacial Myology
Sleep Medicine Clinics (1556-407X)	(NQ) Interdisciplinary	*No IF*	Tracked in references	Cooper, 2010	Orofacial myology and myofunctional therapy for sleep related breathing disorders	Non-systematic literature review	1	Orofacial Myology
Sleep Science (1984-0659)	B4 Interdisciplinary	*No IF*	Scopus	Diaféria et al, 2011	Phonoaudiological assessment of patients with obstructive sleep apnea	Observational study (cross-sectional)	5	Orofacial Myology

Legend: (NQ) Not included in Qualis CAPES scoring; (*) Not scored in the Physical Education area; IF: Impact factor

The descriptive statistical analysis revealed that the Qualis of publications was A1 in 7 papers (17.9%), A2 in 4 (10.3%), B1 in 14 papers (35.9%), 1 paper B2, 1 B3, 1 B4 (2.6%). The remaining 11 papers (28.1%) were published in journals not scored in the Qualis for area 21 of CAPES.

Considering the 30 journals with publications included in this study, 9 did not have impact factor, and the other 21 journals had impact factor with mean 3.49, median 2.42, standard deviation 2.82, maximum 11.99 and minimum 0.78.

Concerning the indexing of papers, 7 were found both on PubMed and Scopus (17.9%), 9 in Scopus (23.1%), 8 only in PubMed (20.5%), 6 in Lilacs (15.4%) e 1 was found both in Lilacs and Scopus (2.6%); further 8 (20.5%) were found by consulting the references of included papers.

The distribution of publication years was diffuse, with 1 paper published in years 1987, 1993, 2002 and 2004; 3 publications in 2006 and 2007; 2 in 2008; 4 in 2009; 5 in 2010;1 in 2011; 3 in 2012 and 2013; 4 in 2014 and 7 in 2015. Analysis in 5-year periods revealed the distribution presented in Figure 5.

The levels of evidence 10, 9, 8 and 6 presented 2 papers each (5.2%); level 5 was assigned to 17 papers (43.6%), 4 for 7 papers (17.8%), and level 1 for 7 papers (17.8%), as described in Figure 6.

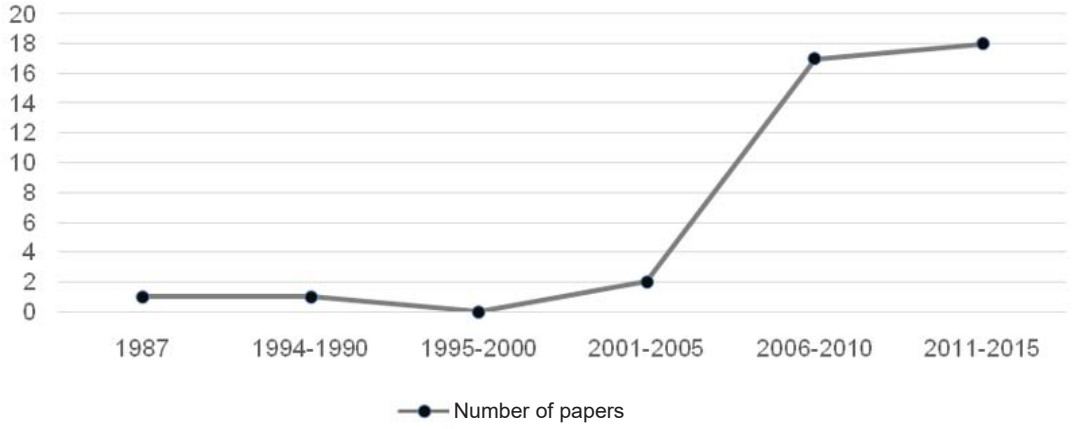

Figure 5. Analysis of number of papers according to year of publication, in 5-year periods

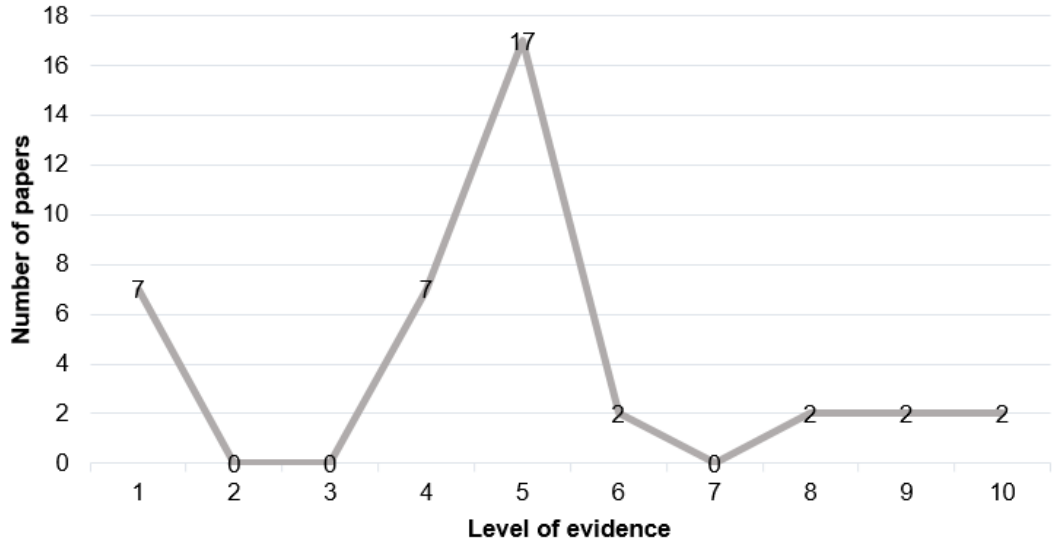

Figure 6. Number of papers according to level of evidenc

Among the 11 specialties of Speech-Language Pathology, 20 papers were specific of Orofacial Myology, 7 of Voice, 3 Language, and the fields of Audiology, Neuropsychology and Neurofunctional Speech-Language Pathology presented 2 publications, while Community Health, Gerontology/Neurofunctional Speech-Language Pathology and Language/Orofacial Myology had 1 publication each (Figure 7).

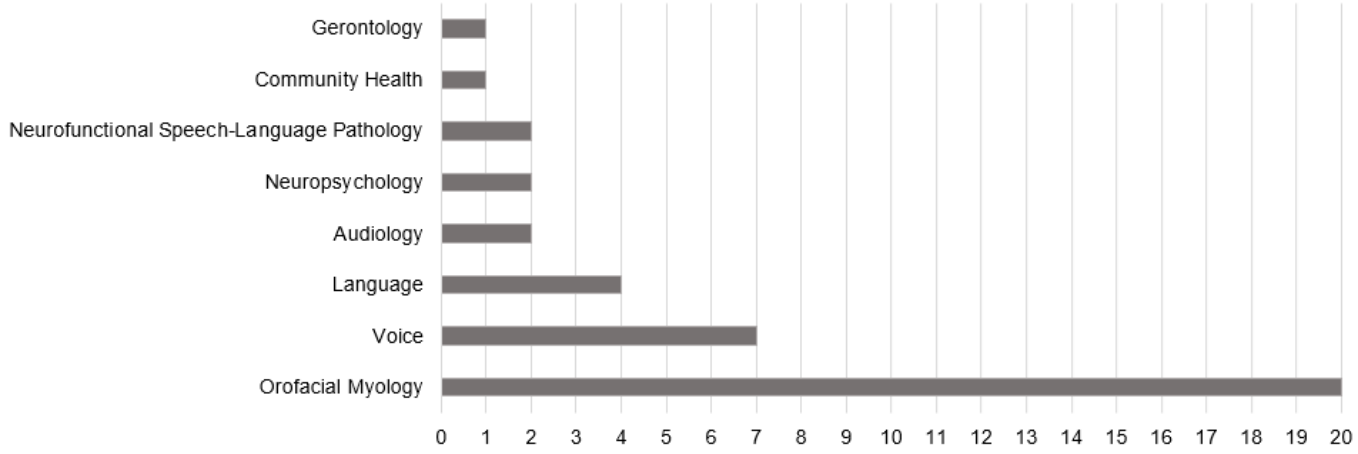

Figure 7. Number of papers according to specialty of Speech-Language Pathology

The Spearman correlation did not reveal significant difference, as presented in Table 3.

Table 3. Spearman correlation of the variables Qualis, year of publication and level of evidence

CORRELATIONS	p value
Qualis X year of publication	0.30
Qualis X level of evidence	0.06
Year of publication X level of evidence	0.98

Legend: $p<0.05$ – statistically significant value

Characterization of publications of a certain field widens the knowledge on the advancement of science, allowing more effective establishment of new pathways for scientists. Especially for OSA and its interface with Speech-Language Pathology, this process is justified to strengthen the advanced action of this area in the evaluation, treatment, prevention and health promotion in clinical situations with OSA.

During the search, more papers were found in PubMed and Scopus. Analyzing only the included papers, the Scopus database promoted the greatest refinement of the search, followed by papers located in PubMed and Scopus, and then papers located among the references of included papers. Concerning the PubMed and Scopus, it should be highlighted that the former presents 25 millions of biomedical citations on the Medline, online journals and books[25] while the second is considered the largest database of abstracts and literature citations, besides including conference proceedings[26].

Despite the high number of papers found (983), the percentage of exclusion was also high (96.03%) and may be explained by the diverse descriptors and free terms used in an attempt to address all fields of Speech-Language Pathology.

There was greater number of papers in score B1 of Qualis, followed by papers without Qualis score in the area 21 of CAPES. A previous study analyzing the level of publications of a post graduation program in Speech-Language Pathology revealed the same predominance of Qualis B1[27].

Among the journals included, 77% presented impact factor, different from a previous study in Speech-Language Pathology in which only 23% of journals had impact factor, besides presenting lower minimum and maximum values compared to the present study[27]. The finding that only 5% of papers were specific of Speech-Language Pathology may explain the higher impact factor observed in studies of Speech-Language Pathology and OSA, since this

factor is calculated according to the number of citations of papers published by a certain journal, evidencing low citation of papers published in national journals of Speech-Language Pathology[28].

There was greater volume of publications in Speech-Language Pathology about OSA after year 2006 and greater concentration of papers in level of evidence 5, corresponding to observational study design. No studies were found about this aspect, yet this data agrees with a previous study about the level of evidence of publications in Dentistry[29].

Finally, concerning the field of Speech-Language Pathology, there was predominance of Orofacial Myology, which differs from the results of publications of Speech-Language Pathology in general, which identified Language as the first area of publication, followed by Audiology[30].

The importance of this study is the characterization of the advancement of Speech-Language science within the scope of OSA, broadening this diffusion and guiding the onset of new investigations in this field.

CONCLUSION

The scientific production of Speech-Language Pathology was analyzed in its interface with obstructive sleep apnea, evidencing the predominance of Orofacial Myology as the specialty of publication, with higher frequency of level of evidence 5, corresponding to cross-sectional observational study.

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