









# Speech-language therapists with Ph.D. in Brazil: profile from 1976 to 2017

## *Fonoaudiólogos Doutores no Brasil: perfil da formação no período de 1976 a 2017*

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### Descritores

Fonoaudiologia  
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### ABSTRACT

**Purpose:** To investigate the association of variables gender, year of the thesis defense, type and location of the teaching institution, the thesis subject and the program in which the thesis was developed. **Methods:** Data were collected through consultation of the Lattes Platform of the National Council for Scientific and Technological Development (1976-2017). Filters were activated to follow the inclusion criteria: is Brazilians with a degree in Speech-Language Therapy, and also with a PhD degree. The established variables were recorded in the STATA/IC 14.2 software, and a descriptive analysis of the data and trend of them were performed. **Results:** Most of the 1,125 subjects who composed the sample were female, graduated in a public higher education institution, located in the Southeast region, and defended their thesis in a Program related to Health Sciences, or in Speech-language therapy. **Conclusion:** The profile found is similar to the profile of previous studies, and it shows the significant growth of speech-language therapists with PhD degrees in research activities and qualified scientific production.

### RESUMO

**Objetivo:** investigar, no grupo de fonoaudiólogos brasileiros titulados doutores, as variáveis sexo, ano de defesa da tese, tipo e localização da instituição de ensino, inserção do programa em que a tese foi desenvolvida e temática da mesma. **Método:** os dados foram levantados por meio de consulta à Plataforma Lattes do Conselho Nacional de Desenvolvimento Científico e Tecnológico – CNPq (1976-2017). Filtros foram acionados para seguir os critérios de inclusão: ter formação em Fonoaudiologia, ser brasileiro e ter se titulado doutor. As variáveis estabelecidas foram registradas no programa STATA/IC 14.2 e foi realizada análise descritiva dos dados e da tendência de crescimento do número de teses. **Resultados:** dentre os 1.125 profissionais que compuseram a amostra, a maioria era do sexo feminino, titulou-se em instituição de ensino superior pública, localizada na região Sudeste, e defendeu temática em Programa pertencente à área de Ciências da Saúde, sobre Linguagem e Audiologia. **Conclusão:** o perfil encontrado se assemelha a levantamentos realizados anteriormente e evidencia o contínuo crescimento significativo de fonoaudiólogos doutores, fato que garante a inserção do fonoaudiólogo em atividades de pesquisa e produção científica qualificada.

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## INTRODUCTION

Conducting a research in order to know the number of Brazilian speech-language therapists with doctoral degree, to be able to analyze some related aspects, was always present among the tasks developed by me (Lésleie) and Professor PhD Ieda Chaves Pacheco Russo (*in memoriam*).

Four studies have been conducted to date. This process was initiated in the late 1990's, when a survey that included the search in the Lattes Platform and in the Graduate Programs of the field found 91 theses defended from 1976 to early 1998, mostly by women (96.7%). A significant increase was noticed since the 1990s (83.5%), with a higher percentage among those who have chosen to defend their theses in Programs related to Communication Disorders (42.9%), at the Federal University of São Paulo (33%), on topics related to Hearing and Balance (40.6%) and Language (27.5%)<sup>(1)</sup>.

Then a new survey was conducted in an attempt to update these data, considering the beginning of 1998 until the end of 2003, when 203 theses were registered by Speech-language therapists. The profile found was very similar with respect to the choice of Programs related to Communication Disorders (42.4%), on topics related to Hearing and Balance (40.3%) and Language (37%). In addition to these data, this study presents a discussion in which the Speech-Language Pathology field was compared to Physiotherapy, Physical Education and Psychology. Some data were compared within the Speech-Language Pathology, evidencing differences between *latu sensu* and *stricto sensu* courses<sup>(2)</sup>.

A new survey conducted in 2010 that included the whole period (1976-2008) showed a total of 504 theses, of which 97.0% were defended by women; (47.62%), in programs in Life Sciences area (57.54%), especially on the Language (34.52%). A regression analysis was performed at that time, which evidenced the increase in the number of theses according to the year. This trend was also recorded in the choice of the Program (88% of the variability in Applied Humanities And Social Science and Life Sciences) defended in public institutions, more particularly, in Public State institutions ( $p < 0.001$ ) and related to Language and Motricity and Orofacial Functions ( $p < 0.001$ )<sup>(3)</sup>.

To avoid the loss of this analysis, even with the death of Professor Ieda, and without being able to access the original worksheet, a new data collection was conducted in 2015, considering the period from 2009 to 2013<sup>(4)</sup>. The recorded data showed a total of 271 doctoral degrees defended that, when added to the previous years, reaches an estimate of 775 professionals with doctoral degree. The profile remained similar in the analysis of the period: as for gender, the highest number of defenses was performed by women (98.2%), in public higher institutions (79.7%), located in the Southeast region (69.4%), and related to language (35.1%). The increase in the introduction of speech-language therapists in graduate programs not related only to the health (35.8%) reflected at that moment in the expansion of the diverse fields of activity of these professionals.

The progressive increase in the number of professionals with doctoral degree certainly influences the greater quantity and

quality of Brazilian research, and also enables the consolidation of the area and the internationalization of those involved.

Knowing the profile of Brazilian speech-language therapists with doctoral degree is essential to better understand the process that is being established in the professional qualification of the area, besides being an important indicator to analyze the maturation of Speech-Language Pathology in the country. This type of research has been increasingly common that it is even possible to record bibliographical sources that highlight the possibilities in other areas of an institutional evaluation of higher education through the follow-up of alumni<sup>(5)</sup>, or to understand how public policies promote the growth, quality and internationalization of universities<sup>(6)</sup>, or to identify the scientific fields in Brazil that have generated new knowledge, as well as its evolution, trends and the relationship between scientific production and the national graduate program<sup>(7)</sup>. Especially in Speech-Language Pathology, it is possible to highlight the survey conducted in eight Brazilian graduate programs in the area, most of them in the South and Southeast regions, which recorded the production of different works from 118 teachers. It was concluded that the area presents a significant collaborative network showing the evolution of production by 2011<sup>(8)</sup>.

The purpose of this research was to investigate the association of variables gender, year of defense of the thesis, type and location of the teaching institution, with the topic of the thesis and the inclusion of the program in which the thesis was developed.

## METHODS

The data were collected on April 3, 2018, through a consultation in the Lattes Platform of the National Council for Scientific and Technological Development (CNPq). The section "Search Lattes Curriculum (Simple Search)" was accessed on the home page, and then the following options were checked in "Search mode": "Name", "On database", "With doctoral degree" and "Brazilians and foreigners". The subsection "Area of activity" was checked in the "Filter type" session, in which the search was restricted according to the curriculum, using "Health Sciences" and "Speech-Language Pathology" as descriptors for "Broader area" and "Area", respectively. It was found in the results that other professionals, who performed activities related to Speech-Language Pathology and Audiology, were part of this list. Thus, each curriculum was accessed to check the inclusion criteria that were having a degree in Speech-Language Pathology, being Brazilian and also having a doctoral degree.

The period of analysis consisted of the period from 1976 (first record) to 2017. 1,333 records were identified. Of these, 208 were excluded since they did not fit the criteria for analysis: 25 without a doctoral degree, 147 without a degree in Speech-Language Pathology, 18 foreigners, one duplicate, one with no profile identified and 16 defenses in 2018. Remaining 1,125 theses eligible for analysis.

The study variables were: gender, time between undergraduate and doctoral degrees (years), type of educational institution (Public State, Federal, Private or International), geographic region of the institution (North, Northeast, Southeast, South, Central-West or other countries); area of knowledge of the

National Council for Scientific and Technological Development - CNPq (Health Sciences, Human Sciences, Biological Sciences, Social Sciences, Exact Sciences or Linguistics, Languages and Arts), areas of activity for Speech-Language Pathology practice established and recognized by the Brazilian Society of Speech-Language Pathology and Audiology (Audiology, Dysphagia, Speech-Language Pathology, Language, Oral Motricity, Voice, Collective Health or others), year of defense of the thesis, period of defense of the thesis (grouping of the years of defense – 1976 to 1992, 1993 to 1997, 1998 to 2002, 2003 to 2007, 2008 to 2012, 2013 to 2017).

At first, a descriptive analysis of the data was performed using absolute and relative frequencies. The tendency to increase the number of theses defended per year was evaluated through linear regression models, quadratic (polynomial of degree 2) and exponential models, with the quadratic model showing the best predictive ability in all the tests. The quadratic regression model uses the following equation:  $y = a + bx + cx^2$ , where the dependent variable (Y) is the number of theses and the independent variable (x) is the year of defense. The initial year of the analysis was standardized by subtracting the first year assessed, so that year 0 (zero) represents the number of theses in the first year of the analysis (1976). The chi-square test was used in order to compare the period of defense of the thesis according to other variables. The five-year periods from 1998 to 2017 were used for this last set of analyzes, while the period from 1976 to 1997 was excluded due to the small number of theses, which represented a total of 1,051 theses in the end. A statistically significant difference of  $p < 0.050$  was considered in all analyzes. The analyzes were performed using the STATA/ C 14.2 software and the graphs were created through the Microsoft Excel 2016.

## RESULTS

The analysis period consisted of 42 years (1976 to 2017) with 1,125 theses defended. Table 1 shows that 96.4% of the authors of the theses were female, and most of them (55.6%) defended their theses in a period between 8.0 and 15.9 years after graduation. As for the educational institution, they were mainly Public State (41.5%) and Federal (40.2%), and located in the Southeast region (70.0%) and Brazil (95.6%). Health Sciences (67.6%) was the most frequent area of knowledge, and one fifth of the graduates were in Programs related to Communication Disorders or Speech-Language Pathology (20.7%), while Language (35.2%) and Audiology (26.0%) were the areas with the highest number of theses. Concerning the completion period, the number of theses was increasing over the years, and the highest proportions occurred in the last two periods: 35.5% from 2013 to 2017 and 28.5% from 2008 to 2012.

Figure 1 and Table 2 show that there was an increase in the number of theses during the analysis period (1976 to 2017). The quadratic model predicted 94.1% of the increase variability, and it was considered statistically significant ( $p < 0.001$ ), and intensified from the 2000s. Table 2 also shows the increase in the different areas of Speech-Language Pathology, and it was statistically significant in all of them ( $p < 0.001$ ), with greater

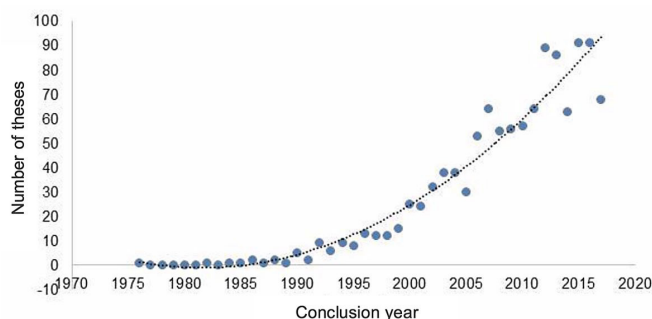
dispersion from the 2000s. Audiology and Language, which had the highest number of theses, presented the best adjustments (84.9% and 84.2%, respectively). As for the other areas, the variability in the increase was 76.1% for Collective Health, 74.2% for Voice, 73.3% for Oral Motricity and 72.3% for other areas combined. Dysphagia and Educational Speech-Language Pathology, which had the smallest number of theses defended, presented a variability in the increase in the period of 59.7% and 59.9%, respectively.

Table 3 shows that only gender was not associated with the period of completion of the thesis ( $p = 0.275$ ). With respect for the time between the completion of the undergraduate degree and the thesis, there was an increase in those with a shorter time interval (3.0 to 10.9 years): there was also an increase in the time interval between 3.0 and 7.9 years increased, from 6.5% and 7.2% in the first surveys (1998 to 2002 and 2003 to 2007) to 10.3% and 11.3%, respectively, in the most recent periods (2008 to 2012 and 2013 to 2017). Those with 8.0 to 10.9 years moved from 16.7% and 20.2% in the initial periods (1998 to 2002 and 2003 to 2007) to 31.8% and 26.8% in the most recent periods (2008 to 2012 and 2013 to 2017). These changes were statistically significant ( $p = 0.013$ ).

Regarding the type of educational institution, despite Public State and Federal institutions were the main responsible for the professional qualification of individuals with doctoral degree, statistically significant changes were recorded during the period ( $p < 0.001$ ), especially the decrease of international institutions (from 4.6% in 1998-2002 and 4.5% in 2003-2007, to 2.8% in 2008-2012 and 2.5% in 2013-2017) and an increase of Public Federal institutions, which reached 50.6% in the most recent five-year period (2013-2017).

There were also statistically significant differences ( $p < 0.001$ ) regarding the geographic region. The Southeastern region was always dominant in all periods, but it showed a decrease mainly due to the increase in defenses in the South region, which represented 1.9% in the first five years and increased to 21.1% in the last five years. Central West region, in turn, showed a slight increase from 0.0% in the first five years to 3.5% in the last five years. While the North region always had the lowest percentage of professionals of doctoral degree, showing only 1.0% in the most recent period.

Statistically significant differences ( $p < 0.001$ ) were also recorded in the area of knowledge. Health Sciences has always



**Figure 1.** Increase (adjusted by quadratic regression model) in the number of theses defended by Brazilian Speech-language therapists (1976 to 2017)

**Table 1.** Distribution of these defended according to characteristics of the authors, educational institutions, areas of knowledge and expertise, and completion period, by Brazilian Speech-language therapists (1976-2017)

Variables	Total	
	no.	%
<b>Gender</b>		
Female	1,085	96.4
Male	40	3.6
<b>Time between undergraduate and doctoral degrees (years)</b>		
4.0 to 7.9	104	9.2
8.0 to 10.9	283	25.2
11 to 15.9	342	30.4
16 to 20.9	183	16.3
21 to 25.9	103	9.2
26.0 and higher	99	8.8
Not reported	11	1.0
<b>Type of educational institution</b>		
Public State	452	40.2
Public Federal	467	41.5
Private	157	14.0
International	49	4.4
<b>Geographic regions</b>		
North	4	0.4
Northeast	119	10.6
Southeast	787	70.0
South	141	12.5
Central-West	23	2.0
Other countries	49	4.4
Not reported	2	0.2
<b>Country</b>		
Germany	3	0.3
Argentina	14	1.2
Australia	1	0.1
Brazil	1,075	95.6
Canada	2	0.2
Chile	1	0.1
United States of America	8	0.7
France	8	0.7
United Kingdom	2	0.2
Italy	1	0.1
Japan	1	0.1
Paraguay	3	0.3
Paraguay	5	0.4
Not reported	1	0.1
<b>Knowledge area</b>		
Health Sciences	761	67.6
Human Sciences	132	11.7
Biological Sciences	17	1.5
Social Sciences	3	0.3
Exact Sciences	12	1.1
Linguistics, Literature and Arts	200	17.8
<b>Area of activity</b>		
Audiology (hearing and balance)	293	26.0
Dysphagia	57	5.1
Educational Speech-Language Pathology	48	4.3
Language	396	35.2
Oral Motricity	96	8.5
Voice	104	9.2
Collective Health	67	6.0
Other	64	5.7
<b>Period of completion (year) of the doctoral degree</b>		
1976 to 1992	26	2.3
1993 to 1997	48	4.3
1998 to 2002	108	9.6
2003 to 2007	223	19.8
2008 to 2012	321	28.5
2013 to 2017	399	35.5
<b>Total</b>	<b>1,125</b>	<b>100.0</b>

**Table 2.** Quadratic regression models for the number of theses defended according to the area of activity of Speech-Language Pathology, by Brazilian Speech-language therapists (1976 to 2017)

Area of activity	No. of Theses	Equation	r <sup>2</sup>	p
<b>Overall (all areas)</b>	<b>1,125</b>	$y = 1.1844 - 0.8403x + 0.0755x^2$	0.9410	<0.001
Audiology (hearing and balance)	293	$y = -0.5076 - 0.0021x + 0.0133x^2$	0.8492	<0.001
Dysphagia	57	$y = 0.57725 - 0.1697x + 0.0075x^2$	0.5970	<0.001
Educational Speech-Language Pathology	48	$y = 0.1439 - 0.0553x + 0.0038x^2$	0.5992	<0.001
Language	396	$y = -0.8440 - 0.0110x + 0.0185x^2$	0.8416	<0.001
Oral Motricity	96	$y = 0.0109 - 0.0755x + 0.0068x^2$	0.7325	<0.001
Voice	104	$y = 0.0675 - 0.0644x + 0.0066x^2$	0.7416	<0.001
Collective Health	67	$y = 1.0156 - 0.2640x + 0.0106x^2$	0.7608	<0.001
Other	64	$y = 0.7427 - 0.1983x + 0.0085x^2$	0.7225	<0.001

**Table 3.** Distribution of theses according to characteristics of interest and period of completion of the thesis, by Brazilian Speech-language therapists (1998-2017)

Variables	1998 to 2002		2003 to 2007		2008 to 2012		2013 to 2017		Total		p*
	N	%	N	%	N	%	N	%	N	%	
<b>Gender</b>											
Female	107	99.1	214	96.0	312	97.2	381	95.5	1,014	96.5	0.275
Male	1	0.9	9	4.0	9	2.8	18	4.5	37	3.5	
<b>Time between undergraduate and doctoral degrees (years)</b>											
3.0 to 7.9	7	6.5	16	7.2	33	10.3	45	11.3	101	9.6	0.013
8.0 to 10.9	18	16.7	45	20.2	102	31.8	107	26.8	272	25.9	
11 to 15.9	39	36.1	70	31.4	86	26.8	118	29.6	313	29.8	
16 to 20.9	16	14.8	49	22.0	40	12.5	58	14.5	163	15.5	
21 to 25.9	14	13.0	23	10.3	28	8.7	29	7.3	94	8.9	
26.0 and higher	10	9.3	19	8.5	28	8.7	41	10.3	98	9.3	
<b>Type of educational institution</b>											
Public State	41	38.0	121	54.3	144	44.9	124	31.1	430	40.9	<0.001
Public Federal	42	38.9	72	32.3	125	38.9	202	50.6	441	42.0	
Private	20	18.5	20	9.0	43	13.4	63	15.8	146	13.9	
International	5	4.6	10	4.5	9	2.8	10	2.5	34	3.2	
<b>Geographic regions</b>											
North	0	0.0	0	0.0	0	0.0	4	1.0	4	0.4	<0.001
Northeast	0	0.0	19	8.5	44	13.7	56	14.0	119	11.3	
Southeast	101	93.5	171	76.7	228	71.0	230	57.6	730	69.5	
South	2	1.9	21	9.4	32	10.0	84	21.1	139	13.2	
Central-West	0	0.0	2	0.9	7	2.2	14	3.5	23	2.2	
Other countries	5	4.6	10	4.5	9	2.8	10	2.5	34	3.2	
<b>Knowledge area</b>											
Health Sciences	76	70.4	136	61.0	204	63.6	302	75.7	718	68.3	<0.001
Human Sciences	15	13.9	27	12.1	36	11.2	37	9.3	115	10.9	
Linguistics, Literature and Arts	15	13.9	52	23.3	75	23.4	44	11.0	186	17.7	
Other	2	1.9	8	3.6	6	1.9	16	4.0	32	3.0	
Audiology (hearing and balance)	38	35.2	64	28.7	77	24.0	90	22.6	269	25.6	<0.001
<b>Area of activity</b>											
Dysphagia	3	2.8	5	2.2	17	5.3	32	8.0	57	5.4	
Educational Speech-Language Pathology	6	5.6	4	1.8	15	4.7	19	4.8	44	4.2	
Language	32	29.6	91	40.8	123	38.3	116	29.1	362	34.4	
Oral Motricity	6	5.6	23	10.3	29	9.0	34	8.5	92	8.8	
Voice	17	15.7	16	7.2	28	8.7	37	9.3	98	9.3	
Collective Health	2	1.9	11	4.9	15	4.7	39	9.8	67	6.4	
Other	4	3.7	9	4.0	17	5.3	32	8.0	62	5.9	
<b>Total</b>	<b>108</b>	<b>100.0</b>	<b>223</b>	<b>100.0</b>	<b>321</b>	<b>100.0</b>	<b>399</b>	<b>100.0</b>	<b>1,051</b>	<b>100.0</b>	

\*Chi-squared test. Note: totals in each variable may differ from 100.0% due to incomplete data

been the most representative area (68.3% in the period of analysis). Linguistics, Languages and Arts showed greatest contributions in the periods from 2003 to 2007 (23.3%) and from 2008 to 2012 (23.4%). While, Human Sciences showed a decrease from 13.9% in the first five years to 9.3% in the last five years. The group composed of the other areas combined always recorded the lowest contribution.

Due to the small number of theses in some categories, there was great variability in the areas of Speech-Language Pathology. However, statistically significant differences were identified ( $p < 0.001$ ). The language, which had the highest numbers throughout the period (34.4%), decreased in the last five years to 29.1%, that is, less than in 1998 to 2002 (29.6%). Audiology follows it with 25.6% in the whole period, but also showed reductions in the most recent periods, from 2008 to 2012 (24.0%) and from 2013 to 2017 (22.6%). In turn, Oral Motricity increased in the period from 2003 to 2007, with a decrease in the following periods. On the other hand, there was an increase of dysphagia (from 5.3% in 2008 to 2012 to 8.0% in 2013 to 2017), Educational Speech-Language Pathology (from 4.7% in 2008 to 2012 to 4.8% in 2013 to 2017), Collective Health (9.8% in 2013 to 2017), and in the other areas combines (from 3.7% in the first five years to 8.0% in the last five years).

## DISCUSSION

Although the historical dimension of the promotion of scientific production in Brazil has been the subject of an increasing number of academic studies in recent years, the literature on the subject is still scarce. It can be noticed that it is possible to frame only a fragmented picture of the evolution over the years of the initiatives conducted in the country to bring science to the general public, and this research intends to contribute to disseminate it.

It should be noted that a graduate degree has an important role, as it allows the process of scientific research, enhances the investigative dimension of the profession, and, from a perspective based on critical theory, empowers professional staff<sup>(9)</sup>.

It is worth remembering that in 1965, there were 27 master's and 11 doctoral courses available in Brazil, and 50 years later (2015), there are 5,537 graduate courses, including 1,905 of doctoral degrees, 3,105 of masters degrees and 527 of professional masters<sup>(10)</sup>, that is, the professional qualification has been growing in Brazil due to the policies implemented to this end.

Analyzing the number of professional with a doctoral degree in an area has been a traditional indicator to understand the scientific qualification<sup>(11)</sup>, and this survey was able to found 1,125 Speech-language therapists with a doctoral degree, showing an increase of 45.1% when compared to the estimated total number in a survey presented in previous study<sup>(4)</sup>. That is: research conducted by Paz, Carmo and Ferreira (4) showed only the data update considering a specific period (2009-2013), as it was not an analysis of the whole process. At that time, the total corresponding to the time studied was 271 theses, which added to the material presented in previous study<sup>(3)</sup>, estimated a total of 775 productions.

When using the Lattes Platform to collect data of this research – even being aware of its limitations regarding data record –, it was assumed that most of the Graduation Programs were based on data record on Lattes Platform in order to elaborate its *Sucupira* report (a tool used to collect information, perform analyzes and assessments and to be the benchmark of the National Graduate System). Doctoral students are increasingly required to keep up-to-date information, and thus, it is believed to be possible to perform similar and more reliable analyzes every year.

The numerical growth recorded in this research seems to be opposite to results found in another study concerning undergraduate studies in Speech-Language Pathology<sup>(12)</sup>. When analyzing data on the number of courses, vacancies offered, actual enrollments and professional from public and private universities in Brazil and Chile, the authors concluded that there was a significant increase in the number of courses and vacancies from 1990 to 2010, but there was also a decrease in the demand for the speech-language pathology course, mainly in Brazil, from 2008.

Speech-language pathology is a predominantly female profession, and it was also found in this research when analyzing the gender variable (96.4%) and in previous ones that recorded 98.2%<sup>(4)</sup> and 97.2%<sup>(3)</sup>, respectively. The analysis that associated the gender variable and the period of completion of the thesis is in line with the continuity of the presence of woman in greater number in defenses.

The time between undergraduate and doctoral degrees for more than half of the participants ranged from 8.0 to 15.9 years, and it should be emphasized that one quarter of the sample obtained a doctor degree between 8.0 and 10.9 years, a time that would be enough to complete undergraduate studies, then a masters degree (average 2 years) and also a doctoral degree (average 4 years). The incentive for Higher Education Institutions – with their own support or from CNPq to develop Scientific Initiation projects and the need to submit a Course Completion Work, in most undergraduate courses – seems to be encouraging the speech-language therapists to enter the graduation Programs, right after the undergraduate course.

The new standards set by the Coordination of Improvement of Higher Education Personnel (CAPES), which is responsible for the evaluation of Graduate Programs, regarding the shorter time for defense, as well as the fact that most development agencies have increased the offer of scholarships in certain periods, also seems to have encouraged those who want to continue their professional training<sup>(13)</sup>.

In this research, public institutions (81.7%) were the type of institution that recorded the highest number of speech-language therapists, which is similar to the survey conducted in 2010 (81.1%) and in 2015 (79.7%)<sup>(4)</sup>, when a single period was analyzed. Trend analysis shows an increase in the number of defenses in Public Federal institutions, especially in the last five years (53.5%). This trend is probably due to the incentive in the country for the opening of Public Federal higher education institutions and the consequent creation of Graduate level Programs.

It should be noted that in relation to the region, the Southeast still stands out (70.2%) with similar results when compared to the previous analysis (69.4%)<sup>(4)</sup>. However, South region

(12.6%) shows evolution in the trend analysis, certainly due to two consolidated Programs, which since the 1990s have been responsible for the qualification of masters and doctoral degrees (Federal University of Santa Maria, since 1992, and *Universidade Tuiuti do Paraná*, since 1998).

Central-West region, in turn, shows a discrete beginning, characterized mainly by two universities: the University of Brasília and the Federal University of Goiás.

These numbers referring to the type of institution and location of the degrees may be modified when the next decade is analyzed, since CAPES recently approved new programs in the Northeast in public (Federal) institutions at a moment for master's degree. The growing number of Graduate Programs in Speech-Language Pathology, especially in public higher education institutions, facilitates the qualification of more people, due to the possibility of obtaining a scholarship. The Federal University Restructuring and Expansion Support Program (REUNI), the Quota Policy for the admission of public school students, with positions reserved for low-income groups and ethnic minorities, and Student Assistance Policies may also be responsible for future changes in numerical records<sup>(14)</sup>.

In the early days of Speech-Language Pathology, the restricted offer of possibilities for doctoral degrees in the country and the ease of studying in certain programs abroad (mainly in Argentina in the 1990s) led to the search for degrees in foreign institutions. In 2005, a study found that more than 40% of Brazilian professionals with doctoral degree until 1985 had obtained their degree in foreign institutions<sup>(13)</sup>. Incentive policies from CAPES and other development agencies certainly helped to change these numbers and to explain the reduction in the number of Brazilian professionals with doctoral degree in international institutions (in this survey, only 2.5% in the period 2013-2017). It should be noted that these same policies have led the Brazilian professionals with doctoral degree to seek to continue their qualifications in postdoctoral programs abroad, which increases the possibility of internationalization of the Programs.

Health Sciences (68.1%) was the most frequent area of knowledge in this research, and it was also highlighted in previous surveys: lower (54.57%) in 2004<sup>(2)</sup> and higher (69.4%) in 2015<sup>(4)</sup>.

This research allowed us to notice that there was a greater record in Linguistics, Language and Arts from the current century when compared to previous periods, and a decrease in Human Sciences. This can be explained by the graduate courses extending their requirements to related areas, in addition to the expansion of doctoral courses, in which the growth rate was higher in the period from 1998 to 2011 when compared to the main areas of knowledge, such as the multidisciplinary area, whose growth rate was approximately 1,083%<sup>(15-17)</sup>.

In this way, speech-language therapists currently have the possibility to attend a doctoral degree in specific programs for their area, in a public or private educational institution, or even in other areas. This data is corroborated by the finding of this study that recorded a decrease in the percentage indicated by the previous surveys (20.7% in this study and 42.4% in 2004<sup>(2)</sup>) when comparing the degrees in specific Programs of the area

(Speech-Language Pathology and Communication Disorders) and others.

Language (34.7%) and Hearing and Balance (26.0%) were the most prominent areas of activity in the analysis. It should be noted that Hearing and Balance recorded the highest percentage in the first two surveys<sup>(1,2)</sup> (Hearing and Balance with 40.6% and Language with 27.5% in 1998; Hearing and Balance with 40.3%, and Language with 37% in 2004), while Language recorded the highest percentage in the other two surveys<sup>(3,4)</sup> (Language with 34.54% and Hearing and Balance with 32.34% in 2010; Language with 35.1% and Hearing and Balance with 23.5% in 2015). It should also be noted that other areas are drawing the attention of the speech-language therapists with respect to Doctoral Programs.

In this research, there was an increase recorded in the different areas of speech-language pathology, but once again the Hearing and Balance and Language presented the best results (85.4% and 84.6% of growth variability, respectively), being followed by: Collective Health, Voice and Oral Motricity.

Initially Speech-Language Pathology set four areas, namely: Language, Hearing, Voice and Oral Motricity<sup>(18)</sup>. It can be said that these four areas would share the analysis presented in this study with the establishment of the Department of Collective Health. It is easy to understand this fact since Collective Health concerns the knowledge used to act in the health problems related to the general population or particular groups and may be associated across any of the other four areas listed above. It should be noted that during the analysis of the area of activity variable, there were many discussions among the researchers involved in this article in order to define what would be more prominent on reading the title and consequently the abstract.

Dysphagia and Educational Speech-Language Pathology even recorded a few theses, which is probably in line with the time in which these areas were incorporated into the others. The Dysphagia Committee was created at the beginning of the 2000s as a subdivision of the Department of Orofacial Motricity of the Brazilian Society of Speech-Language Pathology and Audiology (SBFa), and the Normative Resolution of SBFa that determined the establishment of the Department of Dysphagia was created soon after, in 2012<sup>(19)</sup>. In the same direction, the Educational Speech-Language Pathology was created and recognized by the Federal Board of Speech, Language and Hearing Sciences (CFFa) with recommendations for the action recorded in the Resolution no. 309/2005<sup>(20)</sup>.

In particular, when the beginning of the Department of Educational Speech-Language Pathology is recorded, it is possible to analyze the very beginnings of the profession, as when it began to be idealized in the 1930s, with the concern of Health and Education to correct the so-called language errors presented by students<sup>(18,20)</sup>.

It should be noted that while the Brazilian Society sets seven Departments (Hearing and Balance, Dysphagia, Educational Speech-Language Pathology, Language, Oral Motricity, Voice and Collective Health), the Federal Board of Speech, Language and Hearing Sciences indicates 12 areas of expertise, namely: Audiology, Dysphagia, Gerontology, Educational Speech-Language Pathology, Neurofunctional Speech-Language Pathology,

Occupational Speech-Language Pathology, Neuropsychology, Language, Fluency, Orofacial Motricity, Voice, and Collective Health<sup>21</sup>. Another relevant aspect is that the majority of the 6,882 speech-language therapists with a specialization, selected Audiology (36.4%), which was followed by Orofacial Motricity (27.3%), Voice (15.6%) and Language (13.3%)<sup>(21)</sup>. This fact, which differs when compared to the speech-language therapists with a doctoral degree, is certainly linked to the professional training for specialists, which is consolidated since the 1980s, and some of which are often offered as face-to-face or distance learning modules in different cities of the country.

Finally, the quadratic model used in this research indicates the intensification of defenses, especially since the second half of the 1990s, when there was an incentive in the speech-language pathology to continue the professional qualification with a proposal to open different specializations and an increase in the offer of Graduate Programs<sup>18</sup>. Some aspects have been presented, but there are still many gaps in order to compose a complete historical picture of this professional qualification.

More than updating the data collected in previous articles, the conduction of this research is a special tribute to Professor Ieda PhD as a recognition of her accomplishments in Speech-Language Pathology.

## CONCLUSION

The profile found is similar to the profile of previous surveys with a prevalence of defenses by women, who present a higher percentage in the Southeast region, in public institutions, in programs related to the Health Sciences area, on Language issues, and also highlights the continued and significant increase of speech-language therapists with doctoral degrees, which ensures the inclusion of the speech-language therapist in research activities and qualified scientific production.

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## Authors' contributions

*LPF, project management, conception and design, data interpretation and analysis, critical review of the article and final approval of the version to be published; PRRF, project conception and design, data interpretation and analysis, critical review of the article and final approval of the version to be published; ACOG, project conception and design, data interpretation and analysis; ARGF, project conception and design, data interpretation and analysis; CARM, project conception and design, data interpretation and analysis; EH, project conception and design, data interpretation and analysis; PSP, project conception and design, data interpretation and analysis; SNF, project conception and design, data interpretation and analysis, critical review of the article and final approval of the version to be published.*