IDENTIFICATION OF LANGUAGE DISORDERS IN THE SCHOOL SETTING

Identificação dos distúrbios da linguagem na escola

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ABSTRACT

Purpose: to assess whether early education teachers are able to identify children with language development impairments. **Methods:** the present comparative cross-sectional observational study was conducted in underserved early childhood education schools. The study sample comprised 14 teachers and 91 schoolchildren in the age range of 2 years to 4 years, 11 months who were regularly enrolled in the selected schools. The teachers completed a questionnaire concerning the children's development status, and a speech-language evaluation was conducted with all children. The level of agreement between the speech-language assessment and that conducted by the teachers was measured using Kappa coefficient; sensitivity and specificity were calculated considering the speech-language evaluation as the gold standard. **Results:** the speech-language evaluation showed that language development was impaired thus: 22% of the children had impaired reception; 34.1% showed emission impairment; 35.2%, cognitive deficits, and 6.6% had motor deficits. Slight agreement was found between the speech-language evaluation and that performed by the teachers. The sensitivity of the teachers' assessment ranged between 0.3-0.4 while specificity ranged between 0.6-0.9. **Conclusion:** the teachers had difficulties in identifying the children at risk for language disorders.

KEYWORDS: Language Development; Child Language; Child Rearing; Speech, Language and Hearing Sciences

INTRODUCTION

Language is a system of symbols that enables communication between individuals in a limitless and highly structured manner. By relating arbitrary symbols to specific meanings, emotions and thoughts can be expressed through gestures, writing, or speech[1].

The ability to acquire language is exclusive of humans. The use of language allows individuals to enhance their knowledge, interact, and develop their reasoning ability[2].

Language acquisition and development is an evolutional process whose critical period takes place between 0–6 years[3-6]. During this period, the child undergoes two distinct developmental stages: pre-linguistic and linguistic. The pre-linguistic period is the stage of vocalizations, and continues up to 11–12 months of life. The linguistic period is the time when the child begins to speak his/her first words, with comprehension and intentional communication gaining considerable momentum. Over time, the child progresses to complexity of expression. This process is continuous and develops in an orderly and sequential fashion. By the age of 5 years, the child shows substantive linguistic development and appreciable proficiency in basic grammar and all speech sounds[3-6].

Given that much of the language acquisition and development process occurs in the setting of institutions of early childhood education, it is important that schools provide children with conditions that facilitate and encourage their use of language as much as their physical, motor, cognitive, emotional and social-environmental development. The school is a privileged setting for language acquisition and development as it offers children one of their most important communicative environments. It also

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Conflict of interest: non-existent

constitutes an ideal space for the practice of the speech-language pathologist[7,8].

In early childhood education, it is essential that educators have an understanding of the development of language so that they can facilitate this process[9], since children spend most of their day with these professionals. Once teachers are well informed about the normal language development process, they will be able to propose strategies to enhance learning. In addition, they will be capable of identifying the disorders more easily and assist in parent guidance and in referring the children to specialists when needed[10-12]. Thus, when the speech-language pathologist and the educator work together collaboratively, the integration of their shared knowledge will greatly contribute to the development and learning of the students[13].

The objective of the present study was to determine whether childhood education teachers are able to identify the children at risk for language development deficits.

METHODS

The present study was approved by the Research Ethics Committee of the Universidade Federal de Minas Gerais (UFMG), CAAE registry 06691212.1.0000.5149. All the parents or legal guardians of the children and all the teachers participating in the study provided written informed consent after the study subject, objectives, and relevance had been clarified.

This investigation was a comparative cross-sectional observational study conducted at three early childhood education schools under agreement with Belo Horizonte city hall, Minas Gerais state. A short questionnaire with objective questions concerning the development of the schoolchildren aged between 2 years and 4 years 11 months was prepared and subsequently given to the school teachers. The answers were compared with the speech-language assessment[4] performed with the same children.

The study sample comprised 14 teachers and 91 schoolchildren regularly enrolled in the selected schools. The students' ages ranged from (a) 2 years to 2 years 11 months, (b) 3 years to 3 years 11 months, and (c) 4 years to 4 years 11 months. The study was conducted with children between 2 years and 4 years 11 months because in the range 0–2 years the child is only beginning language acquisition, and this would hinder the identification of language disorders by the educators. As from 5 years of age, language impairments become more noticeable, even by lay persons.

The study included the teachers who (a) were working at the above mentioned early childhood schools with children aged between 2 years and 4 years 11 months, and (b) provided written informed consent. To participate in the study, the children should be (a) regularly enrolled in those schools in 2012, (b) between 2 years and 4 years 11 months of age, and (c) authorized by their parents or legal guardians through a written informed consent document.

Teachers were excluded if they completed the questionnaire incorrectly, incompletely, or did not answer the questionnaire on the children at all. Children were excluded from the sample if they had associated neurological or psychiatric deficits, or syndromes with a definite diagnosis as well as those whose parents or legal guardians filled the informed consent sheet incorrectly, incompletely, or did not provide it at all.

The educators completed a self-report questionnaire with questions regarding their professional activity and the language development of the children in their classes with regard to the domains of communicative receptive and expressive language, motor skills, and cognition. The questionnaires were collected by an outside contributor and were only delivered to the investigator responsible for the speech-language assessment after all data had been collected, so that the examiner had no knowledge of the answers given by the teachers.

The language development assessments were performed by the same investigator, in a classroom, during an individual session of approximately 40 minutes and in the children's play environment when necessary. The Behavioral Observation Guidelines for children aged 0–6 years proposed by Chiari et al. (1991)[4] were used to assess the receptive and expressive communicative skills and the motor and cognitive domains of language. However, only the evaluation protocols for children between 2–5 years of age were used in the present study, given the age range of the children assessed. Language development status was observed and classified on the basis of the evaluated domains. The answers were recorded on individual charts, with "yes" or "no" assigned to the behaviors that were observed or not observed, respectively, during the assessment process. The data gathered from history-taking were not taken into account.

Following data collection, the children's evaluation protocols were analyzed qualitatively and categorized as normal or with likely language impairment according to the criteria for language development described in the specialized literature, in accordance with published adapted developmental milestones[3-5,14,15].

The data were analyzed using the Statistical Package for Social Sciences (SPSS) software version 15.0 for Windows – SPSS Incorporation (Chicago, Illinois, USA, 2008).

The analysis of the level of agreement between the speech-language evaluation and the teachers' assessment was performed using the Kappa coefficient[16]. This coefficient can be defined as a measure of association used to describe and assess the level of agreement of tests with nominal scales. The coefficient range categories presented in Figure 1 were considered in the interpretation of the results.

Kappa coefficient	Agreement level
<0	no agreement
0 – 0.19	slight
0.20 – 0.39	fair
0.40 – 0.59	moderate
0.60 – 0.79	substantial
0.80 – 1	almost perfect

Figure 1 - Interpretation of the Kappa coefficient values[16]

Sensitivity and specificity were calculated to evaluate the intrinsic quality of the educators' assessment considering the speech-language assessment the gold standard for identifying disabilities in the evaluated domains. For the purpose of the present study, sensitivity represented the probability of the teacher's assessment identifying an impairment in a child who did have that impairment in the evaluated domains. On the other hand, specificity was regarded as the probability of the teacher not identifying an impairment in a child who did not have that impairment in the evaluated domains. Sensitivity and specificity values were expressed in numbers ranging from 0 to 1, with values closer to 1 representing greater sensitivity and specificity.

RESULTS

In total, 91 schoolchildren participated in the study—38 (42%) female and 53 (58%) male. Their ages ranged from 2 years to 4 years 11 months, with 17 (19%) children aged between 2 years and 2 years 11 months; 35 (38%) in the range of 3 years to 3 years 11 months, and 39 (43%) in the range of 4 years to 4 years 11 months.

The findings of the speech-language evaluation concerning each domain, by age range, are described in Table 1.

Table 1 - Children with likely impairments in receptive language, expressive language, cognition, and motor domains based on the speech-language assessment

Age (years)	Number and percentage of children with impairments based on the speech-language assessment			
	Receptive n (%)	Expressive n (%)	Cognition n (%)	Motor n (%)
2 (n=17)	7 (41)	2 (12)	5 (29)	2 (12)
3 (n=35)	7 (20)	18 (51)	21(60)	1 (3)
4 (n=39)	6 (15)	11 (28)	6 (15)	3 (8)
Total (n=91)	20 (22)	31 (34)	32 (35)	6 (7)

Table 2 depicts the analysis of the agreement between the speech-language assessment and the teachers' evaluation regarding the children's expressive language, receptive language, cognition, and motor domains by age range.

The sensitivity and specificity of the teachers' assessment were calculated considering the speech-language evaluation the gold standard to identify disabilities across the receptive, expressive, cognitive, and motor domains of language. The results are given in Table 3.

Table 2 - Analysis of the agreement between the speech-language evaluation and the teachers' assessment with respect to receptive language, expressive language, cognition, and motor domains

Age (years)	Domain	Kappa statistic	Agreement level
Overall	Receptive	0.136	slight
	Expressive	0.072	slight
	Motor	0.317	fair
	Cognition	0.181	slight
2	Receptive	–	–
	Expressive	–	–
	Motor	0.13	slight
	Cognition	*0.64	substantial
3	Receptive	0.528	moderate
	Expressive	0.139	slight
	Motor	0.291	fair
	Cognition	0.344	fair
4	Receptive	0.024	slight
	Expressive	0.159	slight
	Motor	*0.854	almost perfect
	Cognition	0.198	slight

Statistical measure: Kappa coefficient
(*) Value > 0.6
(-) Not calculated because no alteration was identified by the teachers in these domains in the respective age range.

Table 3 - Analysis of the sensitivity and specificity of the teachers' assessment relative to the speech-language evaluation ("gold standard")

Age range (years)	Domain	Sensitivity	Specificity
Overall	Receptive	0.333	0.808
	Expressive	0.412	0.676
	Motor	0.267	0.974
	Cognition	0.469	0.712
2	Receptive	–	0.588
	Expressive	–	0.882
	Motor	0.000	0.867
	Cognition	0.333	0.714
3	Receptive	0.667	0.897
	Expressive	0.667	0.517
	Motor	0.111	1.000
	Cognition	0.833	0.522
4	Receptive	0.167	0.852
	Expressive	0.273	0.714
	Motor	0.750	1.000
	Cognition	0.235	0.909

(-) Not calculated because no alteration was identified by the teachers in these domains in the respective age range.
Statistical measures: sensitivity and specificity

DISCUSSION

The results showed high prevalence of language impairments among the schoolchildren evaluated. This finding corroborates other studies conducted in public early childhood education schools[17-20], where the percentage of language deficits was found to be around 30%. The relevant literature[21] showed that language disorders are the most frequent issues in the development of preschool-age children. The great prevalence of language impairments found in the present study is a matter of concern, considering that the study age range included the critical period for language acquisition and development[3-6]. This finding underscores the need for articulated action by the health and education sectors in order to undertake health-promoting strategies.

The literature[22] comparing the development of language by children in public versus private schools of early childhood education has demonstrated that children in public institutions have a higher rate of deficits in language acquisition and development, and that this finding could be associated with the lower level of schooling of the mothers and teachers of those children. However, another study[23] showed that the major difference between public and private schools lies in the background of the teachers and the greater availability of pedagogical materials in private schools. It is noteworthy that the schools examined in the present study are located in very underserved regions, where infrastructure is poor.

From the results presented in Table 1, it can be noted that, overall, the evaluated children showed more deficits in the cognitive aspect of language and fewer motor impairments. With regard to the age ranges, deficits in the receptive domain were more frequent at 2 years while impairments in the expressive and cognitive domains of language predominated above 3 years of age. The results of the present study can be explained by the developmental timeline and the demands at each stage of language development. As the child progresses through the developmental stages, the demands placed on him/her increase, especially with respect to the expressive and cognitive domains, since children are required to enlarge their vocabulary and develop proficiency in grammar and symbolic representation over time[3,6,24-26]. Therefore, close monitoring by specialized professionals is paramount in those age ranges in order to recognize without delay the children who lag behind the expected level of development for their age, thus preventing future complications.

It is worth stressing that the evaluation of motor development is not a specific area of practice for speech-language pathology. However, it was decided to include this assessment because the data evaluated could be observed with no difficulty by following the study protocol. In fact, this assessment was paramount in screening and subsequently referring the children who showed motor impairments based on the speech-language evaluation.

Overall, the level of agreement between the speech-language evaluation and the educators' assessment was slight, with fair agreement only in the motor development domain (Table 2). When the analysis is made by age range and domain, two findings are of note: the substantial agreement in the cognitive domain for the age range of 2 years and the almost perfect agreement in the motor domain for the age range of 4 years. The low level of agreement is believed to be associated with the limited knowledge of the teachers on language disabilities. The literature[9,27] has shown that few educators report knowing what language delay is, even though they consider it to be the most common disorder in early childhood education schools. While teachers have specialized training to work in education, they still need further clarification with regard to the language domains.

The analysis of the sensitivity and specificity of the teachers' assessment, considering the speech-language evaluation the gold standard, showed that, overall, educators can discriminate the children with no language development deficits, with specificity ranging between 0.6 and 0.9. It is believed that teachers can more easily recognize children who have no language impairments because they have more experience with normality.

In the present study, sensitivity was low (range, 0.3–0.4). However, in the analysis by age range, the educators' assessment for children aged 3 years showed 60% sensitivity in recognizing possible deficits in receptive and expressive language, and 80% sensitivity in detecting a cognitive impairment. For children of 2 and 4 years, the educators' assessment had low sensitivity (range, 0.1–0.2). This can be explained by the nature of language development within each age range. The difficulty in recognizing language impairments in younger children could be a consequence of the low linguistic demand that is proper to their age, as it is believed that over time the child will develop language adequately[6]. As for older children, it seems that the difficulty occurs because these children are expected to have considerable proficiency in the basic grammar of their mother language and should already have acquired a substantive amount of speech sounds[6]. This fact could raise doubts as to what the child should have mastered at his/her age. For younger and older children alike, in order

to detect likely language development disabilities, practitioners should be knowledgeable about language development milestones.

The results of the present study revealed the difficulty of educators in recognizing language disabilities. The literature[12,13] has highlighted the need for specific training for teachers, since these professionals are in close and constant contact with the children. Consultation provided by a speech-language pathologist will allow teachers to build knowledge and develop academic strategies of language stimulation, and be able to identify potential deficits and make referrals.

The role of school-based speech-language pathologists is to develop activities in coordination with the teachers to help promote and enhance language development and to prevent communicative impairments. Interventions can involve capacity-building and consultation. The speech-language pathologist is responsible for performing observations of the children, speech-language screenings, and actions conducive to improvements in the school environment [28]. Collaboration between the speech-language pathologist and the educator is key to the success of the participation of speech-language pathology in the school setting. Speech-language pathology, by imparting knowledge on language acquisition and development, and disability prevention to educators, will bring countless benefits to the school environment [12,29].

CONCLUSION

Childhood educators have difficulty identifying children at risk for language impairments. This difficulty is more marked for the age range of 2 to 4 years.

The teachers' perceptions regarding the assessed language domains were more sensitive for the age group of 3 years, especially with respect to cognitive development.

Based on the speech-language assessment, the highest prevalence of language impairments is in the cognitive domain while the lowest rate of disabilities is related to motor skills. The most compromised age range was 3 years, in the expressive and cognitive domains.

It is worth stressing that not all professionals are educators in the actual scenario of the public early childhood education schools. In fact, many of these practitioners are caregivers with no specific technical background to work with child development. Therefore, professional preparation in these public schools is warranted, since these institutions take care of the children in their daily lives. This capacity-building endeavor could be undertaken by the *Unidades Básicas de Saúde* (Primary Health Units) with the service of the speech-language pathologist in partnership with the schools of the community. Further, pedagogical strategies, such as age-appropriate play-based activities, could be used to foster consistent language development in its receptive, expressive, and cognitive domains—since there is no better strategy to fight disability than prevention.

RESUMO

Objetivo: verificar se os educadores infantis são capazes de identificar as crianças com alteração no desenvolvimento de linguagem. **Métodos:** tratou-se de um estudo observacional transversal comparativo realizado em escolas carentes de educação infantil. A amostra do estudo foi composta por 14 educadores e 91 alunos regularmente matriculados nas instituições de ensino selecionadas, nas faixas etárias de dois a quatro anos e 11 meses. Os educadores responderam um questionário sobre o desenvolvimento das crianças e aplicou-se a avaliação fonoaudiológica em todas elas. Realizou-se análise da concordância entre a avaliação fonoaudiológica e a do educador por meio do coeficiente Kappa e cálculos de sensibilidade e especificidade, considerando a avaliação fonoaudiológica como referência. **Resultados:** segundo avaliação fonoaudiológica, o desenvolvimento da linguagem das crianças estava comprometido da seguinte forma: 22% possuíam alteração na recepção, 34,1% na emissão, 35,2% nos aspectos cognitivos e 6,6% nos aspectos motores. Identificou-se baixa concordância entre a avaliação fonoaudiológica e do educador. A avaliação do educador teve sensibilidade que variou entre 0,3 e 0,4 e especificidade que variou entre 0,6 e 0,9. **Conclusão:** os educadores apresentaram dificuldades em identificar as crianças com riscos para alterações de linguagem.

DESCRITORES: Desenvolvimento da Linguagem; Linguagem Infantil; Educação Infantil; Fonoaudiologia

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