STUDY OF THE COMMUNICATIVE PROFILE OF 4- TO 6-YEAR-OLD CHILDREN OF PUBLIC DAY CARE CENTERS

Estudo do perfil comunicativo de crianças de 4 a 6 anos na educação infantil

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ABSTRACT

Purpose: to characterize speech and language development of 4- to 6-year-old children of two day care centers and to discuss interrelations with environmental resources (family and child care). **Methods:** 60 children were assessed. In order to evaluate the language, an observation roadmap proposed in the literature was applied and performance was rated by Performance Ratios. Assessment of speech was done by deploying a phonemic album and classifying it as either appropriate or inappropriate according to two benchmarks. Characterized family environment by a questionnaire (RAF) and the Day Care Centers by the Infant and Toddlers Environment Rating Scale-Revised. Results were analyzed as dependent variables considering the Performance Ratios of the communicative profile and speech ratings and as independent variables for age, sex, Day Care facility and RAF Global Index. A significance level of $p<0.05$ was used. **Results:** the environmental quality of the Day Care Centers was considered satisfactory and both centers had high rates in their communicative performance. There was a statistically significant association between communicative profile and sex and age. Girls and 5-year-old children achieved the highest averages. Also, there was a significant association between the communicative profile composite index and the RAF Global Index demonstrating that family environment influences language development. **Conclusions**: in this sample there was an association between family environment and speech development. Further studies are needed to investigate risk factors for the development of language and speech and to contribute for the development of actions that will promote child health.

KEYWORDS: Child Language; Speech; Family; Child Day Care Centers; Communication; Risk Factors

INTRODUCTION

Healthy child development, in physical, mental, psychological and social aspects, depend on innate biological conditions, but is also influenced by the different systems where the child is inserted, such as family and community. In the first years of life the bonds, care and incentive supplied by the family, in emotional, physical and social aspects, interfere significantly on the child's development and growth. Moreover, family has a role in facilitating the child's socialization, an essential element of cognitive development. Unfavorable psychosocial practices present in the family environment may harm the child's language, memory and social skills and generally, be harmful to their full development[1,2].

Oral communication influences the individual's social insertion and ascent, learning and self-image from the beginning of their development. Biological maturation for phonological acquisition happens in constant exchanges with the environment or context

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in which the child lives. Environments that are not very constructive and stimulating may negatively interfere in speech development[3].

It's expected that, by the age of five, children would be able to produce all of the language's sounds correctly, but many preschool-aged children show speech alterations. Such difficulties can disrupt pedagogical performance, lead to reading and writing learning difficulties, and future emotional problems. This fact highlights the importance of early prevention, identification and treatment of speech disorders, avoiding future learning disabilities [3-5].

Language is a higher mental function that influences the overall development of the child, as it gives the ability to understand their environment and regulate their own behavior. Language difficulties are deficits that undermine the processes of comprehension and verbal expression and interfere with the communicative interrelations and their environment. Language acquisition happens by the interference of individual and genetic factors, as by characteristics of the environment where the child lives. The experiences, contact with materials and games, and interactions with adults are significant factors, which may favor language development. Therefore, another significant factor is the early entry of the child in preschool, since he or she will have access to stimuli different to those observed in the family environment that may also contribute to an appropriate cognitive development [6-9].

The care of children from 0 to 6 years old in day care centers and preschools has been growing in Brazil, becoming, daily, a greater necessity for the population. The majority of the children that attend these institutions stay long hours, which indicates that not only the care of the family environment, but also that of the day care center affects the quality of child development. These institutions are responsible for giving assistance to children in the sense of feeding and basic care, but also for contributing with the development of motor, cognitive, emotional, linguistic and social skills [10-12].

Concerns with the quality of these institutions lead to the creation of observation scales for educational environments, in order to verify and control the condition of day care centers, as these environments can have an impact on health and cognitive and social development of children[12]. These aspects directly influence future school performance, as it's known that prior exposure to childhood education, along with family support, reduces stress and the difficulties found in the transition to Elementary School and favors the child's competence results. Therefore, it is necessary to characterize each of these systems, with regard to the child's living condition and development, so that health prevention and promotion actions may be carried out from preschool phase[13,14].

Seeing that the first years of life are essential to child growth and development, there is the need for evaluation of the environments in which the child spends most of the time. A study conducted in day care centers in the city of Belo Horizonte (MG, Brazil) showed relation between environmental resources and communicative profile of children aged between 1 and 3 years old, i.e., the more incentives there are in the family environment, the better the performance of children on the emission and reception communicative aspects. According to this study, action planning and development in day care centers contribute to the promotion of communicative environments and improvement of resources that affect child development[15].

In Speech, Language and Hearing Sciences there is the need for studies that address the role of family and school in the development of language and speech. Considering the importance ofeffective therapeutic and preventive actions and in contributing to public policies that focus on health education, the present study had as objective to characterize speech and language development in children aged between 4 and 6 years old in two publicday care centers and discuss the interrelations of family and school environmental resources.

METHODS

The study was approved by the Research Ethics Committee of UFMG, report ETIC 202/08.

This is a transversal comparative study with non-probabilistic sample, in which language and speech evaluations were conducted with children between the ages of 4 years and 5 years 11 months and 29 days of age, attending two public institutes in Belo Horizonte (Minas Gerais, Brazil). Institute A is situated in the Eastern Region and institute B in the Northeast Region, both working full time. Recruitment to take part in the study was made by letters, where parents received an invite to take part in the research. When approached during the entry or leaving time of the child at the institute, they were informed of the voluntary character of the study, its objectives and repercussions.

Sixty children of both genders were included in the study, aged form 4 to 5 years and 11 months old, regularly enrolled in the institutions, in the 1st or 2nd period, whose guardians signed the Free and Informed Consent Form (FICF), undertaken the interview with the researchers and completed all stages of the research.

Data collection was performed at the institutes, in rooms assigned by the headmistress. At first,

parents answered an interview conducted by the researcher, which contained questions regarding the child's family environment. The used instrument was the Inventory onFamily Environment Resources (FER)[16]. This inventory contains open questions and multiple-choice items, is composed by ten topics, and was applied as a semi-structured interview, where each topic was presented to the mother/ informant orally. Questionnaire was administered following literature recommendation[17]. The interviewer began by asking the open question that introduces the topic and noted the items mentioned by the informant in their free answer, then presented the remaining items, one by one, if in the initial answer was informed an item that wasn't on the list, it would be noted and marked as "other". The questionnaire was administered at the day care center when the guardian went to leave or pick up the child.

Relative points were calculated for each of the ten subjects and for the complete questionnaire, according to the formula: raw score/maximum score x10, where raw score is the sum of all noted items and maximum score corresponds to the number of items.

This was followed by evaluation of the children. Communicative profile was evaluated in a classroom at the day care center, in individual sessions of approximately 30 minutes, using the *Guide for observation of behavior in children between the ages of 0 and 6 years old*[16]. Language development was observed for each of the participants, arranged according to two major areas: communicative aspects (reception and emission) and cognitive aspects of the language. Records of the answers related to expected behaviors at each age were done on individual records, marking yes or no, respectively, according to the presence or absence of the item. Development indexes (DI) were used to qualify the children's answers[18]. The DI were calculated for each child, in each area, with a maximum value of 100%. The cognitive aspect Performance Ratios (CAPR) where considered the aspects listed by the author on language cognitive aspects, reception Performance Ratios (RPR) and emission Performance Ratios (EPR), the elements of reception and emission of language, respectively.

$$\text{DI: number of evaluated behaviors} - \frac{\text{number of unobserved behaviors} \times 100}{\text{Number of evaluated behaviors}}$$

The development of speech in children was assessed by the Application of the Phonemic Album, in a room at the day care center, in individual sessions of approximately 30 minutes. In this test the child was shown pictures and required identification. The rule for selection of pictures from the book was the position of phonemes in the word. Audio from the assessment was recorded to perform analysis. Identification of speech alterations was conducted based on the perceptive-auditive analysis of the examiner. Omissions, distortions and substitutions presented were listed in a phonemic board from the protocol. Analysis was made through the quantification of the results on a spreadsheet. Results found were analyzed and classified as appropriate or inappropriate according to two references found in literature, where benchmark1 followed the occurrence criteria proposed in 2000[19] and benchmark 2 followed the occurrence criteria proposed in 1994[20]. These benchmarks were chosen for they describe the order of occurrence of all phonemes used in speech therapy, in the field of Speech, Language and Hearing Sciences. Finally, the institute's environment was evaluated according to the ITERS-R (Infant and Toddlers Environment Rating Scale - Revised) scale, adapted version, translated and tested for Portuguese[21], and is composed by seven subscales (Space and Furnishings; Personal Care Routines; Listening and Talking; Activities; Interaction; ProgramStructure; Parents and Staff). The seven subscales are described in 43 items and allow analysis of the elements and organization of the environment, as well as subjective aspects. The scores were based on the researcher's observation and followed the proposal of the literature.

Each item was rated on the following criteria:

- 1 point – inappropriate, indicating the care provided doesn't fulfill basic developmental needs;
- 3 points – minimum, indicating that basic care fulfills basic needs and some other needs of child care and development;
- 5 points – good, with basic conditions for child care and development;
- 7 points – excellent, with high-quality care, with frequent and personalized service, taking into account not only the needs of the group, but also the specifics of each child.

Using these ratings, the average score for each of the seven subscales was calculated, and then the average general score. Day care centers were then classified in three distinct quality levels: low quality (scores between 1 and 2.9),satisfactory level (scores between 3 and 4.9) and high level (scores between 5 and 7).

Descriptive analysis of the frequency distribution of categorical variables and analysis of measures of central tendency and dispersion for continuous variables was performed. To confirm the association between Communicative Profile Composite Index and the independent variables age (4 and 5 years

old), Gender (female and male), Day care center (A and B) and FER Global Index (≤ average and > average), the Mann Whitney non-parametric test was applied, since data wasn't normally distributed. Association between speech benchmark 1 and 2 and other variables was performed using Pearson's Qui-square test. Data analysis was performed using Minitab v.14 software with $p< 0.05$ significance.

RESULTS

The sample consisted of 60 children aged 4 to 5 years 11 months and 29 days, with the highest proportion of children being male, the age of 4 and enrolled on day care center A. The characteristics of the evaluated children are presented on Table 1.

For speech evaluations, 45% and 53.3% of the children were considered having inappropriate speech, according to benchmarks 1 and 2, respectively.

Table 2 presents the distribution of scoresachieved by day care centers A and B, according to the ITERS-R scale. It was noticed that the day care centers had similar and above average overall scores, indicating a satisfactory quality level.

Table 3 shows the Communicative Profile Performance Ratios observed in the overall sample. It can be observed that the median in all indexes was high, with values above 80%.

Table 1 –Sample frequency distribution according to Age, Gender, Institution, FER and speech benchmark variables

Characteristic	N	%
Age (4 years to 5 years and 11 months)		
4 years	31	51.7
5 years	29	48.3
Gender		
Feminine	28	46.7
Masculine	32	53.3
Day care center		
A	46	76.7
B	14	23.3
FER Global Index(GI) (3.0 – 7.1) average=5.6		
≤ average	30	50.0
> average	30	50.0
Speech benchmark 1		
Appropriate	33	55.0
Inappropriate	27	45.0
Speech benchmark 2		
Appropriate	28	46.7
Inappropriate	32	53.3

N – number
IG –Global Index
FER –family environment resources

Table 2 –Score distribution obtained by the ITERS-R scale

Subscale	Day care center A	Day care center B
Space and Furnishings	5	3.8
Personal Care Routines	4.1	3.8
Listening and Talking	4.3	4.3
Activities	4.2	4.2
Interaction	4.5	5.0
Program structure	3.2	3.5
Parents and Staff	3.5	5.0
General score	**4.1**	**4.2**

Table 3 – Results of the Communicative profile Performance Ratios regarding the general sample (n= 60 children)

Communicative profile	Average	S.D.	Minimum	Median	Maximum
Performance Ratios on Reception	95.3	10.8	50.0	100.0	100.0
Performance Ratios on Emission	87.0	12.5	43.8	90.0	100.0
Performance Ratios On Cognitive Aspects	86.4	13.6	35.3	90.3	100.0
Overall Performance Ratios	88.6	10.4	43.6	91.0	100.0

SD – Standard deviation

The results of the Communicative Profile assessment according to age, gender, day care center and FER Global Index are presented on Table 4. It can be observed that the medians reached by the communicative profile, both in day care center A as in day care center B, were high (between 80 and 90%). Association was also found, with statistical significance, between the communicative profile and child gender, where girls had better medians at CAPR and IDG. Regarding age, there was statistically significant association between CAPR and age of children, and 5-year-oldchildren had higher medians in this aspect.

Table 4 – Distribution of the Communicative profile Performance Ratios regarding Institution, Gender, Age and Family Environment Resources Global Index

Characteristic	Communicative Profile											
	Reception DI			Emission DI			Cognitive Aspects DI			Overall DI		
	Median	SD	P*	Median	SD	P*	Median	SD	P*	Median	SD	P*
Age												
4 years	100.0	7.6	0.20	93.8	13.5	0.19	82.4	15.3	**0.00***	92.3	12.6	0.35
5 years	100.0	13.2		90.0	11.5		92.3	8.0		89.7	7.0	
Gender												
Feminine	100.0	10.6	0.23	91.9	10.9	0.14	92.3	11.0	**0.01***	92.6	8.3	**0.02***
Masculine	100.0	11.0		88.8	13.5		88.2	14.8		88.9	11.5	
Institute												
A	100.0	10.8	0.23	90.0	12.9	0.29	88.2	14.7	0.71	89.7	11.3	0.58
B	100.0	10.9		93.8	11.1		92.3	9.4		92.3	6.5	
FER – GI (3.0 – 7.1 pts) Average=5.6 pts												
≤ average	100.0	11.0	0.48	81.3	14.0	0.09	90.3	16.4	0.08	88.9	12.6	**0.03***
>average	100.0	10.7		93.8	10.0		90.3	8.7		92.3	6.4	

*Man-Whitney test
DI – Development Index
SD – Standard deviation
IG –Global Index

When comparing results from speech assessments to the children's characteristics, no association showed statistical significance betweenbenchmarks (appropriate, inappropriate) and none of the compared groups (feminine and masculine, day care centers A and B, 4 and 5 years old). There was high occurrence of children with inappropriate speech in both day care centers assessed, according to both benchmarks.

Table 5 – Distribution of speech assessment results, according to benchmarks 1 and 2, regarding the variables age, gender and Family Environment Resources global index

Characteristic	Benchmark 1					Benchmark 2				
	Appropriate		Inappropriate		P*	Appropriate		Inappropriate		P*
	n	%	n	%		n	%	n	%	
Age										
4 years	16	51.6	15	48.4	0.585	15	48.4	16	51.6	0.782
5 years	17	58.6	12	41.4		13	44.8	16	55.2	
Gender										
Feminine	18	64.3	10	35.7	0.175	15	53.6	13	46.4	0.316
Masculine	15	46.9	17	53.1		13	40.6	19	59.4	
Institute										
A	24	52.2	22	47.8	0.422	21	45.7	25	54.3	0.775
B	9	64.3	5	35.7		7	50.0	7	50.0	
FER – GI (3.0 – 7.1) Average = 5.6 points										
≤ average	15	*45.4*	15	*55.6*	0.43	13	*46.4*	17	*53.1*	0.60
> average	18	*54.6*	12	*44.4*		15	*53.6*	15	*46.9*	

*Pearson's Qui-Square test
P – pvalue
GI –Global Index

DISCUSSION

There was a higher proportion of children from the day care center A in the sample (76.7%), arising from the higher number of children enrolled in this day care center. Regarding the total sample, it was also observed a higher number of 4-year-old male children, as the difference is small (6.6% for gender and 3.4% for age), it did not skew the sample.

Giving the characterization of the day care centers, it was shown that both day care centers A and B reached above average scores, indicating a satisfactory quality level, according to the used instrument's proposal. A study conducted in institutions placed in the same regions of Belo Horizonte (MG, Brazil) where this study was performed showed similar results regarding day care center characterization[15]. Research performed in other regions of Brazil (Northeast and North), using the same scale, show that part of the publicday care centers in these localities show scores below the recommendation by the authors of the scale[12,22].

Regarding language evaluation, it was observed that the average of the communicative profile Performance Ratioswas high and similar in day care centers A and B, which indicates that in both day care centers, the children assessed have an appropriate language development and the children in both day care centers have similar communication profiles. A study done in Belo Horizonte with children aged between 2 and 6 years old of a publicday care center used the same instrument to assess language and also verified that children of this age group received high averages in all assessed aspects[18]. However, it is important to highlight that the referred study has a different scope to the present study and deals with profile comparison of anemic and non-anemic children. Therefore, comparison of data is limited and resides only within the coincidence of study scenarios (day care center), region studied (State of Minas Gerais) and part of the studied age group.

Several studies indicate the importance of children in preschool age attending educational institutions, as in these environments there are stimuli that contribute towards language development[7-9]. In the present study, both day care centers assessed presented satisfactory quality level, confirming other investigations that demonstrated the influence of such environment on child development[12,21].

Of the evaluated children, 5-year-olds had better development of cognitive aspects of language. A study where the development of preschool childrenwas evaluated, in the city of Cuiabá(MT, Brazil), also showed that 5-year-olds had higher percentage of correct scores in language assessment[23].

We observed that girls had higher scores in all aspects of communicative profile, with statistically significant difference for CAPRand IDG. This result confirms a previous study[24]. A Chilean study, with children aged 3 to 5 years old, showed that boys had lower cognitive performance[7].

The present study found statistical significant link between the communicative profile IDG and the FER Global Index, where children that had FER indexes below average also showed lower development in language assessment. Similar results were found in Salvador (BA, Brazil), and the study showed that the quality of instigation at the domestic environment has influence in child cognitive development[2]. Several studies have shown that the presence of materials such as toys and books and conducting activities at home are considered important for language acquisition and development[9,13,23].

Regarding speech assessment, it was noted that a higher percentage of children were considered as having inappropriate speech according to benchmark 2. This benchmark references that children have 5 and half years to comprise a complete phonetic inventory, while benchmark 1gives 6 years and a half as limit[19,20]. Similar prevalence of speech delays (57%) was found in children aged 5 years old in a study conducted in the city of Canoas (RS, Brazil)[3]. We observe that there wasa high proportion of children with inappropriate speech on both day care centers, which demonstrates high occurrence of speech inadequacy in the age group of 4 to 6 years old. Other studies, involving preschool children in the cities of Santa Maria (RS, Brazil) and Belo Horizonte (MG, Brazil) also found high prevalence of speech alterations[5,25].

There isn't consensus in literature regarding the age group and gender in which speech alterations would appearmost, some authors found higher prevalence in the male gender[5] and other studies with preschool children didn't find significant differences between the gender[3,25] In Belo Horizonte, a study with 297 school children also didn't observe difference regarding gender[26]. In the present study there was no statistical significance association between gender and occurrence of speech inadequacies in children.

Studies have demonstrated that phonological acquisition happens with constant exchanges with the environment or context in which the child lives and for his or hers interactions with the adult. Therefore, environments that are not particularly constructive and stimulating may negatively interfere speech[3,8] and language[27-30] development. Nevertheless, no statistically significant association was found between speech development and FER Global Index.

National[28,29,31,32] and international[33] studies demonstrated the importance of family environment in child development. In this measure it is essential to consider economical, cultural and educational aspects of the family. The literature also indicates that the association between positive family and school environments are associated with better developmental levels in childhood and adolescence. Furthermore, literature indicates the importance of school[34,35] in the formation of the subject and the construction of citizenship.

The present study showed that the quality of the family environment significantly influences language development. This environment should be rich in stimulating resources[30] for language development, especially in preschool phase, where the child acquires important knowledge and capacities for school, social and emotional development.

The number of children with speech inadequacies found is worrying, because these difficulties, if maintained, may interfere with communication and other areas of development. Further studies with larger samples are necessary, where risk factors for the development of language and speech are investigated, and that contribute to the development of actions that promote child health in school settings.

CONCLUSION

Results of the present study have shown the occurrence of inappropriate speech in children within the institutes, however not revealing statistically significant associations between performance in speech assessment and the variables gender, institute of origin and age group. It was also found that there was statistically significant association between communicative profile and the gender variable, where girls had better averages. Regarding age, there was statistically significant association between the Performance Ratios for language cognitive aspects and age, where 5-year-olds had higher scores. It is also worth noticing that there was association between family and school environment resources.

RESUMO

Objetivo: caracterizar o desenvolvimento de fala e linguagem de crianças entre 4 e 6 anos de duas creches públicas e discutir interrelações com recursos ambientais. **Métodos:** foram consideradas 60 crianças de ambos os sexos. A linguagem foi avaliada utilizando um Roteiro de observação *do comportamento de crianças de 0 a 6 anos,* com a classificação de Índices de Desempenho. A avaliação da fala foi realizada com um Álbum fonêmico e categorizada como Adequada ou Inadequada. Caracterizou-se o ambiente familiar por meio de um Inventário de Recursos do Ambiente Familiar (RAF) e para observação do ambiente da instituição foi utilizada a escala Infant and Toddlers Environment Rating Scale-Revised. Os resultados consideraram como variáveis dependentes os Índices de Desempenho do Perfil comunicativo e os dados de avaliação de fala; e as variáveis independentes, Idade, Sexo, Creche e Índice Global do RAF. Foi adotado nível de significância $p<0,05$. **Resultados:** a qualidade do ambiente das creches foi considerada satisfatória e o desempenho no perfil comunicativo foi alto em ambas. Houve associação com significância estatística entre perfil comunicativo, o sexo e a idade, sendo que as meninas e as crianças de 5 anos obtiveram maiores médias. Observou-se associação significante entre o Índice geral do perfil comunicativo e o Índice Global do RAF. **Conclusão**: na amostra estudada verificou-se associação entre ambiente familiar e desenvolvimento de fala. Houve grande ocorrência de inadequações de fala nas duas creches. São necessários outros estudos que investiguem fatores de risco para o desenvolvimento de linguagem e fala e possam contribuir com ações promotoras da saúde infantil.

DESCRITORES: Linguagem Infantil; Fala; Família; Creches; Comunicação; Fatores de Risco

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