Analysis of the pragmatic skills in preterm children

Análise das habilidades pragmáticas de crianças nascidas pré-termo

Ana Carla Filgueira de Souza e Souza[1] (iD), *Luciana Lyra Casais-e-Silva[1]* (iD), *Eduardo Pondé de Sena[1]* (iD)

ABSTRACT

Purpose: To characterize the pragmatic skills of preterm children and investigate whether it is correlated with gestational age, gender and age group. **Methods:** 42 low-birth-weight preterm infants of both genders, aged 2 to 4 years, were evaluated. The analysis of the communication profile was performed through the Pragmatics Protocol of the ABFW – child language test in the fields of phonology, vocabulary, fluency and pragmatics. **Results:** regarding the communication initiative, there was a better performance of moderate and late preterm children. Regarding the communicative acts, the children did not reach the reference values proposed by the test. The verbal means were the most used, although there was a high occurrence of the gestural means. The most observed communicative functions were commenting, narrative, game and object request. **Conclusion:** The preterm children had deviations in pragmatic skills in the age group investigated. The linguistic variables described in this study were not correlated with age and gender.

Keywords: Language development; Child language; Child development; Language tests; Premature birth

RESUMO

Objetivo: Caracterizar as habilidades pragmáticas de crianças nascidas pré-termo e investigar se existe correlação com a idade gestacional, o gênero e a faixa etária. **Métodos:** Foram avaliadas 42 crianças nascidas pré-termo, com baixo peso ao nascer, de ambos os gêneros, na faixa etária de 2 a 4 anos. A análise do perfil comunicativo foi realizada por meio do Protocolo de Pragmática do ABFW – Teste de Linguagem Infantil nas Áreas de Fonologia, Vocabulário, Fluência e Pragmática. **Resultados:** Quanto à iniciativa na comunicação, houve melhor desempenho das crianças pré-termo moderadas e tardias. Em relação aos atos comunicativos, as crianças não alcançaram os valores de referência propostos pelo teste. Os meios verbais foram mais utilizados, apesar de haver grande ocorrência dos meios gestuais. As funções comunicativas mais observadas foram comentário, narrativa, jogo e pedido de objeto. **Conclusão:** As crianças pré-termo apresentaram desvios nas habilidades pragmáticas, na faixa etária investigada. As variáveis linguísticas descritas neste estudo não apresentaram correlação com idade e gênero.

Palavras-chave: Desenvolvimento da linguagem; Linguagem infantil; Desenvolvimento infantil; Testes de linguagem; Nascimento prematuro

INTRODUCTION

The literature has been widely discussing the circumstances involving preterm (PT) births, demonstrating that the children are more susceptible to adverse factors that transcend the linguistic, cognitive and motor development. The acquisition and integration of the cognitive and linguistic skills depend on individual aspects, as well as environmental and social interactions, especially during the first years of life, highlighting the crucial role of the early childhood[1]. More than 15 million babies worldwide are born prematurely every year, and the prevalence of prematurity is at approximately 7.2%. Brazil stands tenth among the countries with more premature births[2].

According to the World Health Organization (WHO), preterm (PT) refers to every live newborn (NB) with less than 37 complete gestational weeks, counted from the first day of the last menstrual period; full-term, to the birth that takes place between 37 and 41 weeks and six days; and post-term, to the gestation lasting more than 42 weeks. The preterm infants (PTI) can be classified as: extremely preterm (EPT) when the birth occurs before 28 gestational weeks; very preterm (VPT) when the birth occurs between 28 and 32 gestational weeks; moderate preterm (MPT) to late preterm (LPT) when the birth occurs between 32 and 36 gestational weeks[3].

The premature babies present a substantially high risk of language alterations during their early childhood[4,5]. The manner language is used in the communicative context and its set of rules constitute the pragmatic skills. This type of competence comprises the social cues used by interlocutors and can include verbal and nonverbal communication skills. Hence, pragmatics refers to the effective use of language to interact in other social contexts[6].

Important aspects of neurodevelopment, such as the neurological maturation and bond formation, take place in the first months of life and are important stages for the child's development. The pragmatic skills are essential for interpersonal relationships and social interactions, besides being intensely correlated with academic performance[7]. It is possible to integrate the other linguistic skills, as phonology, semantics, morphology and syntax in conversational contexts, highlighting the intersection between language development and social interactions[8,9].

Considering prematurity as a risk factor for language development, it is emphasized that the early identification intervention procedures can avoid or minimize deficits in childhood regarding communicative performance, cognitive and psychosocial aspects, and learning[10]. Thus, this study aimed at characterizing the pragmatic skills of preterm children and investigating whether they are correlated with gestational age, gender and age group.

METHODS

This study was approved by the Research Ethics Committee of the Bahia State Department of Health – CEP-Sesab, under evaluation report 310.813/13 and amendment 1.952.793/17. It met the guidelines for human research ethics, in compliance with the Brazilian National Health Council (CNS) Resolution 466/12. The Informed Consent Form was signed by the parents or guardians, authorizing the child's participation in the research, after having been given all information and accepted to participate in the study.

This is a descriptive, observational, cross-sectional study. The sample comprised 42 preterm children, aged from two to four years, of both genders, who met the following inclusion criteria: presenting the maternity hospital discharge report stating the gestational week, birth weight, and any complications at birth; a record of the interdisciplinary care on the medical records; absence of brain injury, genetic syndrome and/or psychiatric alterations diagnosis; absence of visual or hearing loss, or any other condition making it impossible for them to perform the activities proposed.

The children who did not meet the inclusion criteria were excluded from the study, as well as those whose parents/guardians could not be reached by telephone contact to schedule an appointment, or who did not attend the pragmatic skills assessment.

The data collection was conducted at the State Prevention and Rehabilitation Center for the Person with Disability (Cepred, its Portuguese acronym), a statewide reference unit of the Brazilian public health care system (SUS) in Salvador, Bahia. From the total of users attending rehabilitation, all the premature babies assisted in the early intervention sector from 2014 to 2018 were selected. Then, the abovementioned inclusion criteria were applied. All the children selected were followed up by an interdisciplinary team and did not present alterations in the neuropsychomotor development. For this reason, they were discharged before participating in the research. It is important to highlight that no complaints were reported in any of the cases regarding deviations in language acquisition.

For the analysis by age group, the corrected age was not considered, since the children assessed in this study were over two years old and had already reached the level of the full-term children during gestation, in their first years of life, after maturation of the central nervous system. This agrees with authors who suggested that age correction is necessary if the child is under two years old[11,12].

The communicative profile was assessed through the pragmatic protocol of the ABFW – child language test in the fields of phonology, vocabulary, fluency and pragmatics[13]. The analysis enabled the number of communicative acts, the communicative means and the communicative functions to be verified. The test application consisted of individually recording 30 minutes of the child's interaction with a familiar adult, in a room the child was acquainted with, during the afternoon, without any competing visual and/or auditory stimuli or other distracting factors that might compromise the assessment.

While the protocol was being applied, the babies were filmed in an interactional and communicative context, with toys adequate for their age group. The assessment was conducted strictly in the same way, and the film was analyzed following the parameters proposed by the ABFE test[13]. The results enabled the functional aspects of communication to be verified. After the assessment, the parents or guardians were instructed concerning language development, making referrals when necessary.

The data collected made possible the analysis of the communicative space occupied by the child in an interactive situation, and of the communicative resources they used in such context. Determining the functional profile of communication is essential for the speech-language-hearing diagnosis, as it enables the analysis of the child's skills in using language with communicative functions, in its relation to more formal aspects[13].

The statistical analysis was descriptively and inferentially conducted. To verify the relation between the communicative acts per minute, communication initiatives and communicative means, in relation to gender, the Mann-Whitney test was used; in relation to age and classification of gestational age (GA), Kruskal-Wallis test was used, as well as in the analysis of the difference between the medians of the communicative functions and the GA. The level of statistical significance considered was $p \leq 0.05$. The data were analyzed through the Statistical Package for Social Sciences (SPSS) software, version 20.0.

RESULTS

The sample was composed of 42 preterm children of both genders, 26 (61.9%) of whom were female, and 16 (38.1%), male, aged from two to four years. The GA ranged from 26 to 36 weeks, with a median of 32 weeks; the birth weight ranged from 530 to 2,310 g, with a median of 1,647.5 g.

The relation between the percentage of communication initiative during the interaction and the GA revealed that the EPT children presented 0% of the communication initiatives; the VPT children, 13.6%; and the MPT/LPT ones, 94.1% (Figure 1).

Regarding the communicative acts per minute, the children did not reach the reference values proposed by the test[11] (from 5 to 7 per minute, on average) for the age group assessed in this study. The values obtained were 3.7 at 2 years; 4.6 at 3 years; and 4.2 at 4 years. In the descriptive analysis, a better performance was noted in females, in the age group of four years, and in the MPT/LPT children (Table 1).

No difference was observed between the mean values of communicative acts per minute for gender (p = 0.409) and age (p = 0.515). The statistical difference became evident in relation to the GA (p<0.001), demonstrating less production of communicative acts per minute on the part of the EPT children (Table 2).
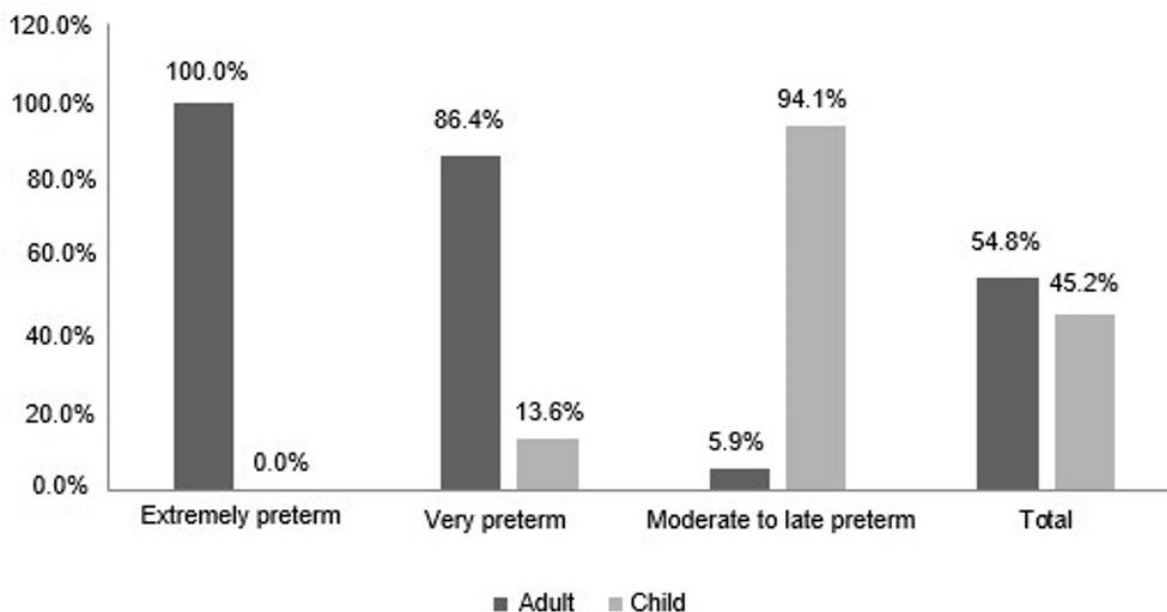
Figure 1. Sample distribution in relation to communication initiative and gestational age classification

Table 1. Descriptive measurements of the communicative acts per minute in relation to the gender, age, and gestational age classification variables

Gender	Total of communicative acts	Median	1st quartile	3rd quartile	Maximum	Minimum
Female (n=26)	103	3.0	2.0	6.0	8.0	1.0
Male (n=16)	74	5.0	3.3	6.0	8.0	1.0
Age	Total of communicative acts	Median	1st quartile	3rd quartile	Maximum	Minimum
2 years (n=10)	37	5.0	1.8	5.0	6.0	1.0
3 years (n=15)	69	6.0	2.0	6.0	7.0	1.0
4 years (n=17)	71	3.0	2.0	7.0	8.0	1.0
GA Classification	Total of communicative acts	Median	1st quartile	3rd quartile	Maximum	Minimum
Extremely preterm (n=03)	5	2.0	1.0	2.0	2.0	1.0
Very preterm (n=22)	67	2.5	2.0	4.3	7.0	1.0
Moderate to late preterm (n=17)	105	6.0	5.5	7.0	8.0	3.0

Subtitle: n = number of subjects; GA = gestational age

Concerning the use of communicative means, the descriptive analysis revealed that there were 48.3% for the verbal (VE), 19.4% for the vocal (VO), and 32.4% for the gestural means (G). No statistical difference was observed in relation to gender and age. However, there was a difference in the VE and G means in relation to the GA (Table 3). In the comparison tests, it was noted that the EPT children presented an inferior performance in relation to the MPT/LPT, regarding the use of the communicative means: VE (p = 0.003) and G (p = 0.011). There was no difference in the VO means, nor between EPT and VPT.

The most prevailing communicative functions in the sample were: commenting (C); narrative (NA); game (G); and object request (OR). No statistical differences were observed in relation to age group and gender (p>0.05). The analysis of association with the GA, in its turn, demonstrated that there was a negative effect of EPT birth on the communicative functions: object request (OR), social routine request (SR), protesting (PR), recognizing the other (RO), exhibiting (E), naming (N), exclamatory (EX), reactive (RE), unfocused (UF), exploratory

Table 2. Relation of communicative acts per minute to the gender, age, and gestational age classification variables

Gender	Statistical test	p-value
Female (n=26)	Mann-Whitney = 176.5	0.409
Male (n=16)		
Age	**Statistical test**	**p-value**
2 years (n=10)		
3 years (n=15)	$X_{(2)}$ = 1.33	0.515
4 years (n=17)		
GA classification	**Statistical test**	**p-value**
Extremely preterm (n=03)		
Very preterm (n=22)	$X_{(2)}$ = 23.02	0.000*
Moderate to late preterm (n=17)		

Kruskal-Wallis test; *Statistically significant value (p≤0.05)
Subtitle: n = number of subjects; GA = gestational age

Table 3. Comparison of the medians of verbal, vocal and gestural means of communication

Gender	VE Med	Statistical test	p-value	VO Med	Statistical test	p-value	G Med	Statistical test	p-value
Female (n=26)	29.5	Mann-Whitney = 160.5	0.209	20.0	Mann-Whitney = 189.0	0.620	28.0	Mann-Whitney = 198.5	0.804
Male (n=16)	41.0			19.0			33.0		
Age	**VE Med**	**Statistical test**	**p-value**	**VO Med**	**Statistical test**	**p-value**	**G Med**	**Statistical test**	**p-value**
2 years (n=10)	51.5			21.5			33.0		
3 years (n=15)	91.0	$X_{(2)}$ = 1.41	0.495	18.0	$X_{(2)}$ = 0.84	0.656	28.0	$X_{(2)}$ = 0.65	0.724
4 years (n=17)	29.0			20.0			30.0		
GA classification	**VE Med**	**Statistical test**	**p-value**	**VO Med**	**Statistical test**	**p-value**	**G Med**	**Statistical test**	**p-value**
Extremely preterm (n=03)	1.0			15.0			23.0		
Very preterm (n=22)	1.5	$X_{(2)}$ = 23.73	0.000*	20.0	$X_{(2)}$ = 2.98	0.225	28.0	$X_{(2)}$ = 10.27	0.006*
Moderate to late preterm (n=17)	95.0			18.0			42.0		

Kruskal-Wallis test; *Statistically significant value (p≤0.05)
Subtitle: Med = Median; VE = verbal; VO = vocal; G = gestural; n = number of subjects; GA = gestational age

Table 4. Analysis of the difference between communicative functions and gestational age

Function	Statistical test	p-value	Function	Statistical test	p-value
OR	$\chi^2 (2) = 23.34$	0.000*	N	$\chi^2 (2) = 27.66$	0.000*
AR	$\chi^2 (2) = 3.33$	0.189	PE	$\chi^2 (2) = 5.25$	0.072
SR	$\chi^2 (2) = 26.95$	0.000*	EX	$\chi^2 (2) = 16.26$	0.000*
CR	$\chi^2 (2) = 5.25$	0.072	RE	$\chi^2 (2) = 20.24$	0.000*
IR	$\chi^2 (2) = 4.78$	0.092	UF	$\chi^2 (2) = 16.26$	0.000*
PR	$\chi^2 (2) = 17.33$	0.000*	G	$\chi^2 (2) = 3.59$	0.167
RO	$\chi^2 (2) = 23.73$	0.000*	XP	$\chi^2 (2) = 22.22$	0.000*
E	$\chi^2 (2) = 22.38$	0.000*	NA	$\chi^2 (2) = 22.99$	0.000*
C	$\chi^2 (2) = 2.93$	0.231	EP	$\chi^2 (2) = 22.99$	0.000*
SR	$\chi^2 (2) = 0.00$	1.000	SG	$\chi^2 (2) = 23.21$	0.000*

Kruskal-Wallis test; *Statistically significant value (p≤0.05)
Subtitle: OR = object request; AR = action request; SR = social routine request; CR = consent request; IR = information request; PR = protesting; RO = recognizing the other; E = exhibiting; C = commenting; SR = self-regulatory; N = naming; PE = performative; EX = exclamatory; RE = reactive; UF = unfocused; G = game; XP = exploratory; NA = narrative; EP = expression of protest; SG = shared game

Table 5. Family's socioeconomic data (n=42)

Variable	n	%
Mother's schooling (in years)		
Not informed	0	0
1 to 5	5	11.9
6 to 9	14	33.3
10 to 12	22	52.4
13 to 18	0	0
Over 19	1	2.4
Monthly income		
Not informed	0	0
Less than 1 minimum wage*	6	14.3
1 minimum wage	18	42.8
From 1 to 2 minimum wages	12	28.6
From 2 to 3 minimum wages	5	11.9
From 3 to 4 minimum wages	0	0
Above 5 minimum wages	1	2.4

*The minimum wage considered was that of 2018: R$ 954.00
Subtitle: n = number of subjects. Source: Data from the research

(XP), narrative (NA), expression of protest (EP), and shared game (SG) (p≤0.05), as seen in Table 4.

For the analysis of the socioeconomic aspects, the mother's schooling and the family's monthly income were considered. It was noted that 52.4% of the sample reported having from 10 to 12 years of study, while 33.3% had from 6 to 9 years of study. Regarding monthly income, 42.8% reported they earned one minimum wage, and 28.6%, from one to two minimum salaries (Table 5).

DISCUSSION

The pragmatic function refers to the knowledge of how language can be effectively used in a conversation. In this study, the communicative profile of children was investigated in their use of skills which enable communicative activity to be established and continued, demonstrating the essentially dialogical character of the interaction, when exposed to situations of spontaneous interaction with a familiar adult. Hence, the analysis of the pragmatic skills of preterm children made it possible to assess the manner they express themselves and relate to the environment where they are in.

In general, the EPT children in this study presented an inferior performance in relation to the MPT/LPT ones, regarding the initiative, the number of communicative acts, the use of communicative means (more G and less VE), and the communicative functions of object request (OR), social routine request (SR), protesting (PR), recognizing the other (RO), exhibiting (E), naming (N), exclamatory (EX), reactive (RE), unfocused (UF), exploratory (XP), narrative (NA), expression of protest (EP), and shared game (SG).

Although there are, both in the national and international literature, many studies on the development of the PT child, there is a shortage of research on the acquisition of the pragmatic skills in this population. In general, male PT children with lower gestational age and with medical complications presented low performances in the language assessment tests[14,15]. Furthermore, they are more susceptible to neurological development deviations, executive function deficits, and behavioral symptoms[15].

Regarding language development, various researches indicate that VPT or EPT children present delays in language skills, when compared to full-term children, approximately 24 to 30 months old[16]. In contrast, other authors did not find significant differences between the PT and the full-term children. Nonetheless, it is highlighted that premature children are at risk of having language difficulties, even if their skills seem to improve with time[17,18].

On the other hand, when assessing the vocabulary, fluency, pragmatics and interaction skills of twenty 5- to 6-year-old low-birth-weight (LBW) PT children with their respective mothers, through the ABFW – child language test[13], it was concluded that the children presented performance below the expected for their chronological age in vocabulary and pragmatics tests[19].

Concerning the communication initiative during the interaction, this study observed better performance in the MPT/LPT children and inferior performance in the EPT and VPT children. The investigation of the individual variabilities in each child's communicative actions enabled the communicative situations to be identified in the adult-child and child-adult interaction context, in the cases of prematurity. The inconsistencies made evident between the interactive space, the means and the communicative function can indicate the need for individual stimuli that favor more balance in communication.

When analyzing the profile of pragmatic skills in children from 36 to 47 months old without language alterations, a study observed that in dialog they responded to conversations more than began them, and that rarely did they not respond to the interlocutor. In producing the discourse, they used predominantly simple and coherent turns. Communication is normally maintained through verbal and nonverbal turns, with the prevalence of the verbal, as well as of the informative function[20].

In this study, concerning the communicative acts, the children did not reach the reference values proposed by the test, and there was no difference in relation to gender and age. However, the MPT/LPT children presented better performance than the EPT, highlighting the possible influence of the low gestational age on language performance. As for the communicative means, the verbal ones were the most used; nevertheless, there was a high prevalence of the gestural means. There was no correlation with age and gender; but regarding the GA, the EPT children used more the gestural (G) and less the verbal (VE) means.

The literature pointed to the high prevalence of the use of gestures in the initial stages of communicative development and confirmed the tendency to decrease their use as the children acquire better communicative conditions through oral language[21]. It is important to emphasize that children with deviations in language expressive skills can compensate for the shortage of oral skills linguistic resources by producing gestures, as observed in this study.

The most prevalent communicative means were commenting (C), narrative (NA), game (G), and object request (OR). No self-regulatory (SR) communicative means was observed, demonstrating that the children did not associate the emissions with motor behavior. The linguistic variables described did not present a correlation with age and gender. In another study, conducted with children six to eight years old with typical language development, it was verified that they also used more often the commenting skill. Moreover, they used dialogical skills more frequently, followed by regulation skills, demonstrating the children's concern to establish a dialogical activity and

regulate the adult's behavior. On the other hand, there was a low frequency of the consent and object request skills[22].

Children with typical language development assessed in the age group of four to five years presented a communicative profile similar to that of the children assessed in this study; they widely used the commenting (C) communicative means[23]. Thus, the use of communicative functions as commenting agrees with the findings of other authors and demonstrates that the children used acts or emissions to drive the other's attention. No reports were found in the literature regarding the absence of other communicative means, as the self-regulatory, as evidenced in this study.

Beginning an interaction and adequately sustaining it, i.e., taking turns and maintaining the subject is a challenge to any speaker, as it requires linguistic, social and cognitive resources to be used. The analysis of the functional profile of the children's communication is of utmost importance to language assessment, since knowing the child's assertiveness and responsiveness enables the type of communicator to be understood and favors better ways to reach greater communicative effectiveness[24].

The findings in this study call attention to the need for early intervention in the children presenting risk factors for language development, such as preterm birth, to avoid future deviations both in oral language and in learning. Children with difficulties to learn presented inferior performance when compared with children who presented typical development, regarding the pragmatic skills. This was so especially in the number of communicative acts, inadequate maintenance of the topic, taking turns, limited strategies for repairing communicative breaks, coherence and cohesion[25].

It is further highlighted that the children assessed presented nonlinguistic risk factors for the deviations in language acquisition, in addition to prematurity, such as socioeconomic, cultural and environmental factors. These factors can work either alone or in combination, favoring the alterations. The socioeconomic disadvantage has been pointed out as a risk factor for development, considering the susceptibility, the family instability and the absence of stimuli, which can result in behavioral and social alterations, so learning and language development are hindered[26].

The sociolinguistic aspects can interfere with the pragmatic skills of children of different socioeconomic levels, suggesting the influence of the social and cultural environment in developing these skills. The environmental aspects can favor language development, contributing for the child's linguistic structures to expand[27]. These factors highlight the importance of speech-language-hearing instructions during the follow-up of children with or without a history of prematurity.

There is a shortage of studies describing the acquisition of pragmatic skills in PT children, as well as the markers of linguistic development. Richer and broader conversation moments are made necessary in the assessment, as certain aspects in pragmatics are not measurable only through short speech samples[28]. The process of constructing language takes place through interaction, wherefrom the child's language is increasingly developed, enriched and brought closer to the model they hear[29].

Given that the pragmatic alterations lead to difficulties in solving interpersonal conflicts, the pragmatic skills must be a field to which constant attention in interventions is given, both in children and adolescents[30]. The early recognition of the difficulties in language acquisition is essential to favor the academic results of children with risk factors. The quick identification of alterations in language development allows the child to benefit from early intervention, to improve their linguistic skills and reduce the possibility of a persistent inability.

CONCLUSION

The assessment of the pragmatic skills of PT children demonstrated that, regarding communicative initiative during the interaction, there was a better performance of the MPT/LPT children. As for the number of communicative acts per minute, the children did not reach the reference values proposed by the test.

The linguistic variables described in this study were not correlated with age and gender.

Thus, this study calls attention to the need for early intervention and speech-language-hearing follow-up of these children. Therefore, the importance of conducting longitudinal studies to investigate the prevalence and persistence of the language alterations, both in the short and long term, is emphasized.

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