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Alterations of the oral language in institutionalized children in community homes: Prevalence and determinants

Alteraciones del lenguaje oral en niños institucionalizados en hogares comunitarios: prevalencia y determinantes

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Abstract

Introduction: Alteration of the language can cause low academic performance and possible school dropout, especially in children from socially and educationally disadvantaged families.

Objective: TTo determine the prevalence and describe the determinants associated with alterations of oral language in children from community homes (HC) that are attended by the Instituto Colombiano de Bienestar Familiar (ICBF).

Methods: Descriptive cross-sectional observational study. Were included 261 children aged 3-5 years. The TECAL and TEPROSIF-R test were used to evaluate the language and a survey of sociodemographic characteristics. The odds ratio was determined to quantify the degree of association. The multivariate model and stepwise backward method were used to selected the variables.

Results: The 54.7% of the children were male, 55.2% entered the garden in the range of 24 to 35 months and 20.3% of the children were part of a family victim of armed conflict. The frequency of oral language alterations was 46.7%, the most common language was mix alteration with 18.4%, followed by alteration of the expressive level (15.3%). The variables occupation of the father (ORa: 2.35) and being a victim of the armed conflict with (ORa: 1.86) possibly explain independently the alterations of language in children attending the HC of the ICBF.

Conclusions: The prevalence of oral language disorders in children attending HC is high; two social variables with an association are detected: the occupation of the father and the victim of the armed conflict, studies with an analytical approach are considered to find factors of protection and risk.

Resumen

Introducción: La alteración del lenguaje puede ocasionar bajo rendimiento académico y posible deserción escolar, especialmente en niños de familias desfavorecidas social y educativamente.

Objetivo: Determinar la prevalencia y describir los determinantes asociados a las alteraciones del lenguaje oral en niños de hogares comunitarios (HC) atendidos por el Instituto Colombiano de Bienestar Familiar (ICBF) de la ciudad de Popayán.

Métodos: Estudio observacional descriptivo de corte transversal. Incluyó 261 niños de 3-5 años de los HC. Se utilizó el test TECAL y TEPROSIF-R para evaluar el lenguaje de los menores y una encuesta sociodemográfica. Para cuantificar el grado de asociación se calculó el OR, y un análisis multivariado y el método stepwise hacia atrás para la selección de variables.

Resultados: El 54.7% de los niños fueron de sexo masculino, el 55.2% entraron al jardín en el rango de 24-35 meses y el 20.3% hacían parte de una familia víctima del conflicto armado. La frecuencia de alteraciones del lenguaje oral fue 46.4%. La alteración mixta fue la más común (18.4%), luego la alteración del nivel expresivo (15.3%). Las variables ocupación del padre (ORa: 2.35) y ser víctima del conflicto armado (ORa: 1.86) posiblemente explican de manera independiente las alteraciones del lenguaje en los niños que asisten a los HC del ICBF.

Conclusiones: La prevalencia de las alteraciones del lenguaje oral en los niños que asisten a los HC es alta, se sugieren dos variables sociales con asociación: la ocupación del padre y ser víctima del conflicto armado.

Key study facts

Objective	To determine the prevalence and describe the determinants associated with oral language alterations in children from community homes (CH) that are cared for by the Colombian Institute of Family Welfare (ICBF) of the city of Popayán
Diseño del estudio	Cross-sectional descriptive observational study
Fuente de información	The institutional folders of each of the children were reviewed to extract personal and family data and the general health of the minor. An interview was conducted with the minor's parents to determine sociodemographic variables. Oral language assessment was performed using the standardized tests for Spanish-speaking Latin America TEPROSIF-R and TECAL
Población / muestra	261 children from a sample of 900 minors belonging to the Community Homes of "La Asociación San José" in Commune 9 and "El Limonar" in Commune 6
Análisis estadísticos	A bivariate and multivariate analysis was performed. Odds ratio (OR) was estimated. A multivariate analysis was performed by means of a binomial logistic regression
Principales hallazgos	Prevalence of language disorders was 46.3%. The children presented alterations across all levels of oral language: vocabulary (9.5%), morphology (8.8%) and syntax (7.3%). The variables that present association with oral language disorders were the father's occupation and belonging to a family that was a victim of the armed conflict.

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Introduction

Language is a communication system whereby information is transmitted through linguistic signs. The encoding and decoding of meanings allow the individual to express and communicate their thoughts and interaction with individuals in family and social settings (1). Oral language learning happens in the early stages of life, reaching about 70% of adult language before five years of age. In the development of language, cognitive, affective and linguistic development processes participate, which is why it is considered a determining factor in the educational and social development of children (2-5). Although there are deleterious signs and symptoms for the diagnosis of oral language disorders, these go unnoticed by parents, educational institutions and growth and development programs, and is generally diagnosed occasionally by specialists and in advanced stages, when the minor presents socialization difficulties throughout the life cycle (6).

On the other hand, the coexistence between behavior problems and language disorders tends to increase as the minor grows up without diagnosis and without intervention, which implies a greater risk of mental health disorders, increasing violent behaviors and tendency to juvenile delinquency, delay and difficulties in the acquisition of literacy skills and school dropout, compared to children with normal oral language development (7,8). The World Health Organization (WHO) recommends monitoring in the early stages of childhood, in order to diagnose and treat any language impairment in order to correct them promptly, especially in the population with social vulnerability such as poverty, violence intrafamily and forced displacement (9,10).

The social and political characteristics of the department of Cauca make it a region with high rates of social exclusion, and forced displacement from the rural area to the capital, exposing minors to adverse environments for their integral development (11). Faced with these social vulnerabilities, the Colombian *Instituto de Bienestar Familiar* (ICBF) seeks to restore the rights of minors through the integration of this population into community homes (CM), with the aim of providing social and educational support to children. However, children's homes do not have a protocol for the assessment of oral language development in this population.

In the capital of the department of Cauca (Popayán), a prevalence of 78.1% was found for alterations in expressive language and 41.7% in comprehensive language in children between 4 and 5 years of age; population from the State Social Enterprise (SSE) (12). Similarly, according to the frequency of the Individual Service Provision Registry (ISPR), the specific developmental disorder of speech and language is the first cause of attention in the practice of Speech Therapy (13); However, the frequency and determining factors of oral language alterations in the most vulnerable child population, such as children institutionalized in community homes (CH) of the ICBF of the city of Popayán (14), are not known. The objective of this research was therefore to determine the prevalence of, and social determinants related to, oral language disorders in institutionalized children in Community Homes of the ICBF of the city of Popayán, Cauca during 2018.

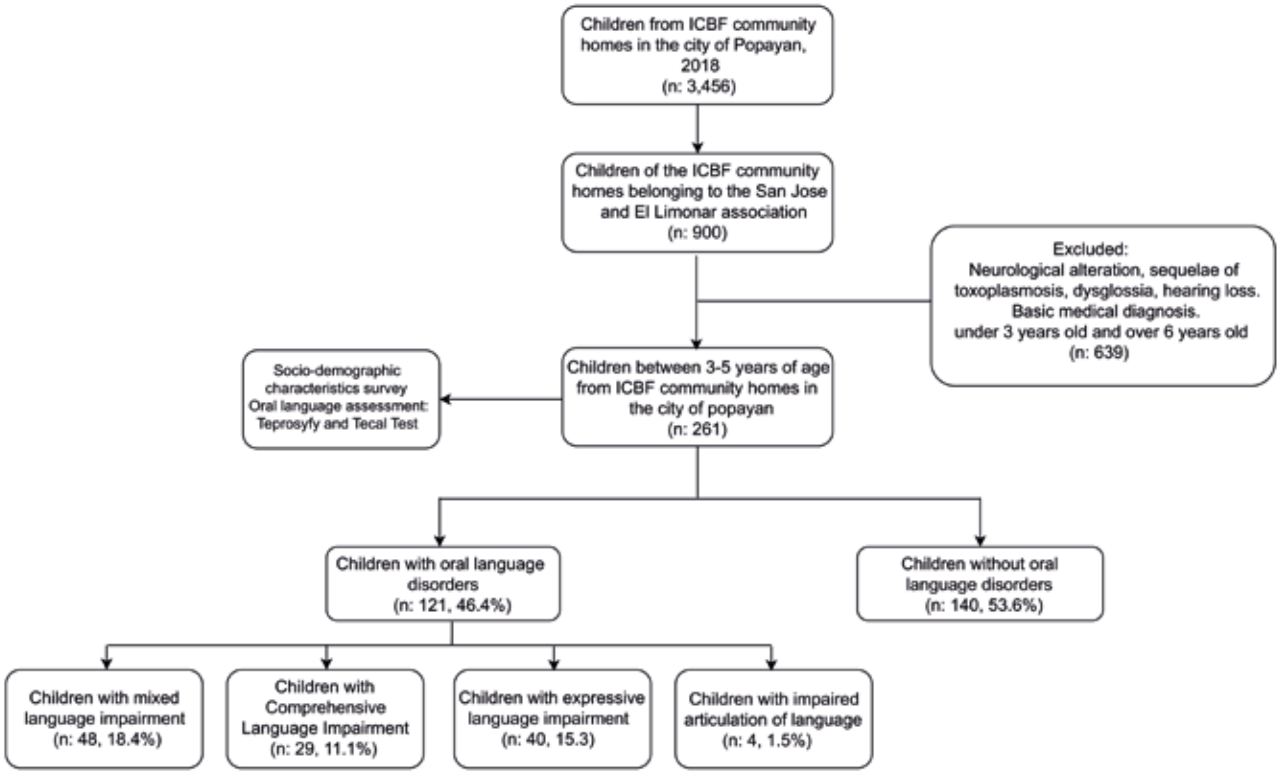

Figure 1. Diagram for the selection of children with oral language disorders of children from ICBF community homes, Popayán 2018.

Methods

Design

A descriptive, cross-sectional observational study was carried out that included children aged 3 to 5 years attending community homes in the city of Popayán in the year 2018.

Population

The minors were randomly selected from among those attending the CH of "La Asociación San José" of Commune 9 and "El Limonar" of Commune 6, which serve 384 and 420 children respectively, which represents 23.9% of the child population belonging to the municipality of Popayán. This includes all the communes in which the ICBF has jurisdiction. As inclusion criteria, age was taken into account (under 3 to 5 years) and as exclusion criteria having had any of the following antecedents reported in the medical history: cerebral palsy, neuromotor disorder, mental retardation, toxoplasmosis sequelae, dysglossia, dysarthria, hearing loss, history of moderate to severe head trauma, history of epilepsy or severe neonatal hypoxia. The sample size was calculated using the Openepi program under the following assumptions: 95% confidence index, 5% standard error, and 80% power, obtaining a sample size of 261 participants (Figure 1).

Process

The parents or guardians of the children were contacted to sign the informed consent. Once the authorization was obtained, the folders containing the personal and family data and the general health of the minor were reviewed, where the exclusion criteria were applied. Information was collected on the variables: sex, age and ethnicity, amongst others. An interview was conducted with the minor's parents to complete the sociodemographic variables that were not found in the internal registry of the CH, such as: origin, socioeconomic status, education of the minor, education and occupation of the parents, parenting guidelines, type of family and exposure to the armed conflict.

Finally, the oral language evaluation was carried out. Speech therapists from the University of Cauca were in charge of this step, all of whom were previously trained by a professor from the Speech Therapy program. The standardized tests for Spanish-speaking Latin America were: TEPROSIF-R, an instrument in charge of evaluating the phonological simplification processes (PSF) of minors, focused on the pronunciation of the minor. The reliability of the test according to the Alpha Cronbach coefficient is 0.90 (15). The TECAL test assesses children's listening comprehension in content including vocabulary and morphological aspects such as nouns, adjectives, pronouns and verbs, as well as an evaluation of syntactic aspects. The reliability of the test according to Pearson's correlation was 0.83 (16).

Ethics

The research proposal was approved by the research committee and classified as risk-free research by the ethics committee of the Universidad Libre [Free University] in Cali and was also approved by the scientific committee of the ICBF.

Analysis

A database was created with the information collected using the Excel 2010 program; Taking into account the variables, 10% of the records were randomly selected to confirm the quality of the data and, in addition, an exploratory analysis was carried out to observe extreme and missing data. All analyzes were performed with the STATA version 14 program.

A univariate analysis was performed and for quantitative values the Kolmogorov-Smirnov test was used, which indicated a non-normal distribution of the data. The variables were summarized in medians and interquartile ranges. The qualitative variables were summarized using percentages and a frequency table. The Chi square test was used for the variables measured in nominal or ordinal scale and for the continuous variables the Student's t test was used for the independent samples.

Once the sample was selected, the condition of exposed versus unexposed was determined in each child, taking into account the sociodemographic characteristics, and the presence or absence of the event of interest (language alteration) in order to perform the bivariate analysis. This explored the differences between children who presented language alterations and those who did not, and the possible association of sociodemographic characteristics. The OR was used as a measure of association, taking into account that the OR of a cross-sectional study is calculated in the same way as the OR of a prospective study: (a / b) / (c / d). In the last stage, the multivariate analysis was performed to present OR adjusted for one or more confounding variables, thus minimizing the confounding bias. The backward stepwise method was used to integrate the variables with a value of $p = 0.20$.

Results

Two hundred and sixty one children between the ages of 3 and 5 years were evaluated, in the period between May and November 2018. It was found that the median age was 52 months (IR: 44-58 months). 54.7% of the children were male, 55.2% of the children entered kindergarten in the range of 24 to 35 months and 20.3% of the minors were part of a family who was a victim of the armed conflict. The other sociodemographic characteristics are described in detail in Table 1.

Regarding language alterations, a prevalence of 46.4% was determined, with a mixed alteration of language and expressive language being the most prevalent (Table 2).

When analyzing the results according to the TECAL test, we found that the majority of children were at a normal level in all evaluations. When looking at the areas with the highest risk, it was determined that this was morphology, followed by vocabulary and syntax. At the deficient level, the area with the highest prevalence was vocabulary, followed by morphology and syntax. For the TEPROSIF-R test, most of the children were at the normal level, but 27.2% of the children showed alterations in the processes of phonological simplification (Table 2).

When exploring the possible sociodemographic variables that are

Table 1. Sociodemographic characteristics of the children in the HC of the ICBF, Popayan, 2018.

Caracteristic	n: 261	%
Age (months)	52*	44-58*
Gender		
Male	143	54.8
Female	118	45.2
Ethnicity		
Other	233	89.3
Indigenous	27	10.3
Mixed	1	0.4
Born in		
Cauca	228	87.4
Huila	9	3.5
Nariño	8	3.1
Valle	7	2.7
Cundinamarca	5	1.9
Antioquia	1	0.4
Equator	1	0.4
Quindío	1	0.4
Venezuela	1	0.4
Age they started nursery (months)		
<12	2	0.8
12-23	38	14.6
24-35	144	55.2
≥ 36	77	29.5
Socioeconomic status		
1	144	55.2
2	96	36.8
3	21	8.0
Father's occupation		
Works	208	79.7
Unemployed	6	2.3
Not registered	47	18.0
Father's schooling		
Primary	52	19.9
High school	132	50.6
Technical	19	7.3
Undergraduate	10	3.8
Not registered	48	18.4
Mother's occupation		
Works	127	44.4
Studies	18	6.9
Unemployed	116	48.7
Mother's schooling		
Primary	55	21.1
High school	167	64.0
Technical	29	11.1
Undergraduate	10	3.8
Who accompanies the child		
Grandmother	55	21.1
Mother	181	69.4
Father, Mother	14	5.4
Aunt	6	2.3
Other	5	1.9
Parenting guidelines		
Yes	167	64.0
No	94	36.0
Domestic violence		
Yes	3	1.2
No	258	98.9
Type of family		
Nuclear	130	49.8
Extended	84	32.2
Single parent	28	10.7
Mixed	19	7.3
Victim of the armed conflict		
Yes	53	20.3
No	208	79.7
Displaced		
Yes	51	19.5
No	210	80.4

*Median and interquartile ranges

associated with having or not having language alterations in the children who attend the CH of the ICBF, statistical significance was found in four variables: age of onset in the garden (OR: 2.94, 95% CI: 1.63 -5.34, p: 0.0001), father's occupation (OR: 0.42, 95% CI: 0.20-0.84, p: 0.008), family victim of the armed conflict (OR: 1.84, 95% CI: 0.96-3.58, p: 0.047) and displacement (OR: 1.86, 95% CI: 0.96-3.66, p: 0.046) (Table 3).

These results suggest that having entered the CH with less than three years of age protected the children from presenting oral language disorders. Regarding the occupation of the father, the prevalence of a language alteration in the children whose parents worked was 42%, in comparison with children who had non-working parents. On the other hand, the variables belonging to a family victim of the armed conflict or being displaced by violence tend to be risk factors for presenting oral language alterations. The multivariate analysis suggests that the variables that independently explain the language alterations in children who attend the CH of the ICBF are: father's occupation (ORa: 2.35, 95% CI: 1.23-4.49, p: 0.004) and being a victim of the armed conflict with (ORa: 1.86, 95% CI: 0.97-3.53 p: 0.013) (Table 4).

Table 2. Oral language characteristics of HC children from ICBF, Popayán 2018

Variable	n: 261	%
Alteration in oral language		
Yes	121	46.4
No	140	53.6
Type of alteration of the language		
None	140	53.6
Mixed	48	18.4
Expressive	40	15.3
Comprehensive	29	11.1
Articulation	4	1.5
Test TECAL		
Normal	182	69.7
At risk	55	21.1
Deficient	24	9.2
TECAL - Vocubulary areas		
Normal	193	74.0
At risk	43	16.5
Deficiente	25	9.5
TECAL - Morphology		
Normal	187	71.7
At risk	51	19.5
Deficient	23	8.8
TECAL - syntax		
Normal	207	79.3
At risk	35	13.4
Deficient	19	7.3
Test TEPROSIF-R		
Normal	160	61.3
At risk	30	11.5
Deficient	71	27.2

Discussion

The prevalence of language alterations in children who attend CH in the city of Popayán was 46.3%. This is related to what was found in another study that evaluated the child population of low socioeconomic strata where 36% of preschool children presented difficulties Language (17). Likewise, 78.1% alterations were reported in expressive language and 41.7% in comprehensive language in the child population attending a SEE in the city of Popayán (12). This is the first study to determine the prevalence of oral language disorders and explore the possible associated factors in children under 5 years of age attending CH of the ICBF, as demonstrated in various studies (Table 5).

The analysis by areas showed that, in general, the children presented alterations in all levels of oral language: vocabulary (9.5%), morphology (8.8%) and syntax (7.3%) this according to the TECAL test, however, it was found great variability in phonological simplification processes (27.2%). In this regard, a study with a population belonging to a low socioeconomic level found a concurrent compromise of receptive vocabulary in participants with delayed language development (18).

In different studies, it has been found that men are more likely to present oral language disorders (23), and we identified greater alterations in children (54.8%). No statistically significant differences were found, however, to suggest that gender is a determining factor for oral language disorders in children who attended this CH.

Regarding the sociodemographic characteristics, it was identified that the evaluated children belonged to a low socioeconomic stratum, as Muñoz described in their study in which 9 out of 10 households belonged to the Class 1 socioeconomic class. Schonhaut also obtained data on the family income of 134 families, with 72% having level 1 income and 19% having level 2 income, with 91% of the studied population concentrated in the lowest income ranges (22). This also affirms on the relationship between poverty and development problems, identifying associated factors in preschool children of low socioeconomic status in the metropolitan region of Chile. In the same way, Blumenfeld identified, in a health center in Buenos Aires, that 89% of the minors belonged to households with criminal activity and a "poverty" level of income, according to official data (12,17,18,21). The socioeconomic aspect is a possible variable that intervenes in the development of language difficulties, which are closely related to problems of social exclusion (24). Social determinants define intellectual development (25), while the environmental context in which the child grows up limits the development of communication and oral language (26).

Regarding schooling, it was found that 70.5% of the children entered kindergarten before the age of 3. Similar results were found in studies which identified that most of the children had been in school before the age of 3 (12). This is an important factor in childhood development, directly related to the physical, cognitive and psychosocial dimensions, which are reflected in the ways in which they relate to others and to the environment that surrounds them. These relationships are necessarily traversed by language as an essential means of communication for children and with the possibilities of interaction offered by socialization agents (19).

On the other hand, in the present study the variable of parental education was not statistically associated with oral language alterations in this sample of children, coinciding with a study in which this association was not established either, but where it was concluded that as the mother's years of schooling increased, the child's range of language comprehension increased (20). Regarding the type of family, 49.8% of the children evaluated are part of nuclear relatives, similar data refer to Cardona (20) and Muñoz (12), where 66.7% and 75% of the children belong to the same type of In this regard, this type of family is typical of low socioeconomic strata, where parental authority prevails and women dedicate themselves to housework (27).

It was also determined that 19.5% of the children of these ICBF community homes are in a situation of displacement. These children have difficulties in adapting to new environments, which is

Table 3. Evaluation of the sociodemographic characteristics of the children in the HC of the ICBF, Popayan, 2018. Bivariate analysis.

Characteristic	Description	n	Children with alterations (n= 121)	Children without alterations (n= 140)	OR	CI (95%)	*p*
Age (years)	< 4	97	40	57	1.39	0.81-2.38	0.201
	≥ 4	164	81	83			
Gender	Masculine	143	70	73	0.79	0.47-1.33	0.350
	Femenine	118	51	67			
Ethnicity	Indígenous	27	13	14	1.08	0.44-2.60	0.844
	Other	234	108	126			
Born in	Other	33	18	15	1.45	0.65-3.26	0.313
	Cauca	228	103	125			
Age they started nursery (years)	<3	184	71	113	2.94	1.63-5.34	0.0001
	≥3	77	50	27			
Teaching time (hours)	≤2	143	74	69	1.62	0.96-2.73	0.054
	>2	118	47	71			
Socioeconomic class	1	144	69	75	1.57	0.93-2.65	0.070
	Other	117	45	72			
Father's occupation	Does not work	53	16	37	0.42	0.20-0.84	0.008
	work	208	105	103			
Father's schooling	low level	101	46	55	0.94	0.55-1.61	0.833
	Other	160	75	85			
Mothers occupation	Does not work	116	48	68	0.69	0.41-1.17	0.148
	work	145	73	72			
Mothers schooling	low level	55	28	27	1.26	0.66-2.38	0.446
	Other	206	93	113			
Child accompanied by	Other People	66	28	38	0.80	0.44-1.47	0.458
	Parents	195	93	102			
Parenting guidelines	No	94	42	52	0.89	0.52-1.54	0.683
	Yes	167	79	88			
Domestic violence	Yes	3	0	3	0	0-1.47	0.105
	No	258	121	137			
Extended family	Yes	84	35	49	1.32	0.75-2.31	0.294
	No	177	86	91			
Nuclear family	Yes	130	61	69	0.95	0.57-1.60	0.855
	No	131	60	71			
Victim of armed conflictv	Yes	53	31	22	1.84	0.96-3.58	0.047
	No	208	90	118			
Displaced	Yes	51	30	21	1.86	0.96-3.66	0.046
	No	210	91	119			

Table 4. Evaluation of factors associated with oral language alterations in children with CH from ICBF, Popayán 2018. Multivariate analysis

Characteristic	Description	n	Cases* (n=121)	Controls** (n=140)	OR	CI (95%)	p	ORa	CI (95%)	p
Victim of the armed conflict	Yes	53	208	22	1.84	0.96-3.58	0.047	1.86	0.97-3.53	0.013
	No	31	90	118						
Father's occupation	Works	208	105	103	0.42	0.20-0.84	0.008	2.35	1.23-4.49	0.004
	Does not works	53	16	37						

represented in shyness or aggressiveness during social integration. This impacts and limits the development of the pragmatics of the language that allows the child to relate and integrate into the environment (11). The only variables that show an association with oral language disorders in children from community homes of the ICBF are the occupation of the father and belonging to a family victim of the armed conflict. The father's occupation indicates that the family has higher economic income, which translates into a better quality of life. In addition, 69.3% of the children evaluated are in the care of the mother, which means that if the father is in charge of earning the household income, then the mother can dedicate most of her time to raising their children (Table 1). On the other hand, although there are no other studies that relate being a victim of the armed conflict with oral language disorders, one study suggests that abuse in childhood affects language development in children and that language difficulties occur according to the type of abuse inflicted on the minor. This research suggests that children's language difficulties may be a consequence of the sociocultural and affective deprivation situation they suffer as result of displacement due to the armed conflict (21).

Weaknesses

In Colombia, there is no standardized test with high sensitivity that is able to assess the language of children, so the classification of oral language disorders may present differences in the population. A test for the Spanish-speaking population was used, which has been used in different studies where Latin Spanish is spoken (17). The study population includes children with special characteristics: the results only explain the observed phenomenon in this specific population. Furthermore, due to the design of the study, which is cross-sectional, these findings cannot be extrapolated. Further studies with a different analytical approach will be required to determine the protective and risk factors.

Strengths

The data collection was carried out prospectively for research purposes. Precision is guaranteed, thus avoiding the presence of information biases. Supplying training to the speech pathologists in charge of applying the tests controlled for selection bias.

Conclusions

Language development is influenced by different environmental factors, which can influence language development positively or negatively depending on the context. Children from ICBF community homes presented particular factors that make them vulnerable, including low socioeconomic level, unemployed mothers, single-parent families where the mother is the head of the household, and families in a situation of displacement, as evidenced in Table 3, where the sociodemographic characteristics of the children are described.

The high prevalence of oral language disorders in children from ICBF community homes shows the need to implement stimulation and monitoring strategies for adequate development. Despite the fact that different social variables were taken into account in the study, the only ones that suggest any relationship with oral language alterations in these children were the occupation of the father and being a victim of the armed conflict.

Recommendations

The community homes of the ICBF need to have a professional in speech therapy to be able to develop a monitoring program evaluating the language of children when they enter the CH and monitoring children with language difficulties. Additionally, workshops should be offered aimed at community mothers, which provide them with the necessary tools to identify the first warning signs of oral language disorders and activities focused on linguistic stimulation, following the guidelines of the normal language acquisition process. Parents and caregivers should also be included in the early stimulation of children's language skills, since they are the main actors in the formation of identity and the development of children's skills, knowledge and behaviors 28. Analytical studies should be carried out in this population to identify risk factors and protective factors, taking into account the social variables that can be modifiable and which can, therefore, favor the integral development of the minor. Professionals should be tasked with evaluating the cost-effectiveness of this. A scale needs to be standardized and validated that evaluates the language of children in Colombia, generating a direct impact on the statistics of the institutions, and for children who present language alterations at the national level.

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Table 5. Main findings on language alterations in children according to the cited studies

Study	Blumenfeld (18)	Velasco (19)	Salazar et al (11)	Cardona et al (20)	Muñoz et al (12)	Schonhaut et al (17)	Moreno (21)	Schonhaut et al (22)
n	138	73	75	30	96	58	39	159
Characteristics								
Design	Analytical observational cross-sectional study	Empirical study	Exploratory study	Exploratory, descriptive, correlational study	Descriptive, cross-sectional study	Analytical cross-sectional study	Analytical observational study	Analytical observational study
Age	2 years	3-4 years	5 and 12 years	1 - 3 years	4 - 5 years	3 - 5 years	5-9 years	3-5 years
Mean age	-	-	-	23.7 months	59.3 months	3 years 11 months	-	4 years
Age of entry to kindergarten	without schooling	68.5% previously schooled	-	-	2.8 years	2 years	-	-
Mothers schooling	High school (43.0%)	-	-	14.4 years	-	11 years	low level	-
Displaced	-	-	si	-	-	-	-	-
Socioeconomic status	low	medium, medium high	-	high	low	low	low	low
Nuclear family	-	-	-	66.7%	75.0%	-	-	-
Domestic violence	-	-	-	-	-	-	Abuse and abandon	
Emotional and physical	-							
Used Test	Mac Arthur Bates Communication Skills Development Inventory	PLON R	Human figure test	ENI, EAD, PLS-4	tReynell test, audiometry, otoacoustic emissions	Teprosif, STSG, screening auditive, WPPSI	McCarthy scale MSCA, BLOC Puyuelo	TEPSI
Language disturbances	11.6%	13.0%	yes	-	78.1% expressive, 41.7% comprehensive	36.0%	100%	GE: 97% GC: 19%
Positive association	Behavioral problems and history of LD*	Socioeconomic status, previous schooling	-	-	-	Family history of LD * or learning	-	-
Without association		-	-	Level of education, occupation and type of family	-	-	-	-

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The researchers do not report a conflict of interest, this research was developed with their own resources.

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