Case Report

Relato de Caso

Phonological awareness abilities of a child with acquired immunodeficiency syndrome before and after speech therapy

Habilidades de consciência fonológica em criança portadora da síndrome da imunodeficiência adquirida: pré e pós-terapia fonoaudiológica

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Keywords

Acquired immunodeficiency syndrome
Child
Speech Therapy
Learning
Language

ABSTRACT

The aim of the present study was to characterize the phonological awareness abilities of a child with Acquired Immunodeficiency Syndrome (AIDS) before and after speech-language therapy. The participant was a 6-year-old girl, first-grade Elementary School student, with AIDS acquired by vertical transmission. The child's phonological awareness abilities were evaluated using the Instrument of Sequential Evaluation of Phonological Awareness (CONFIAS). After this first evaluation, a closed therapeutic program (15 sessions) for phonological awareness was developed, consisting of activities for syllabic and phonemic levels. The CONFIAS was reapplied in the last session in order to investigate therapy effectiveness. In the pre-therapy assessment, the child scored 18 points in syllable tasks and 1 point in phoneme tasks, with a total score of 19 points. In the post-therapy assessment, the child scored 26 points in syllable tasks and 11 points in phoneme tasks, with a total score of 37 points. This study allowed us to characterize the performance of a child with AIDS in tasks of phonological awareness and the effectiveness of the therapeutic program. The score obtained before therapy was much lower than expected for the child's age, and presented significant improvement after speech-language therapy. Thus, professionals working with this population must be aware of therapeutic programs that approach phonological processing abilities in addition to other aspects.

Descritores

Síndrome de imunodeficiência adquirida
Criança
Fonoterapia
Aprendizagem
Linguagem

RESUMO

Este trabalho teve por objetivo caracterizar as habilidades de consciência fonológica em uma criança portadora da Síndrome da Imunodeficiência Adquirida (SIDA) pré e pós-terapia fonoaudiológica. A participante foi uma criança do gênero feminino, de 6 anos de idade, aluna do primeiro ano do ensino fundamental, portadora de SIDA adquirida por transmissão vertical. Foi realizada uma avaliação das habilidades de consciência fonológica por meio da aplicação do teste Consciência Fonológica - Instrumento e Avaliação Sequencial (CONFIAS). Após, foi desenvolvido um programa terapêutico fechado (15 sessões) para consciência fonológica, composto por atividades em níveis silábico e fonêmico. Na última sessão, o teste CONFIAS foi reaplicado para investigação da efetividade da terapia. Na avaliação pré-terapia, a criança apresentou escore de 18 pontos nas tarefas em nível silábico e um ponto em tarefas em nível fonêmico, totalizando um escore de 19 pontos. Na avaliação pós-terapia, o escore obtido em tarefas silábicas foi de 26 pontos e em tarefas fonêmicas 11 pontos, totalizando um escore de 37 pontos. Este estudo permitiu-nos caracterizar o desempenho de uma criança com SIDA em tarefas de habilidades de consciência fonológica e a efetividade de um programa terapêutico. A pontuação obtida na avaliação pré-terapia mostrou-se bastante inferior ao esperado para a idade e apresentou evolução significativa após a realização de terapia fonoaudiológica. Assim, os profissionais envolvidos com esta população devem estar atentos aos programas terapêuticos que abordem, além de outros aspectos, as habilidades de processamento fonológico.

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INTRODUCTION

The Acquired Immunodeficiency Syndrome (AIDS) is an infectious disease caused by the human immunodeficiency virus (HIV). The virus attacks the defense cells of the human body (CD4+ lymphocytes), causing increasingly severe immunodeficiency in affected individuals and facilitating the onset of various opportunistic infections[1,2].

A total of 474,273 cases of AIDS were notified in Brazil from 1980 to June 2007, 289,074 of them in the Southeast, 89,250 in the South, 53,089 in the Northeast, 26,757 in the Center West, and 16,103 in the North. According to the criteria of the World Health Organization (WHO), Brazil has a concentrated epidemic, with a 0.6% prevalence rate of HIV infection in the population aged 15 to 49 years[3].

Regarding the pediatric population, 75 to 80% of HIV-infected children are infected by vertical transmission (from mother to child). The infection can occur at three different times: intrauterine or prenatal period due to passage of the virus through the placenta, peripartum or perinatal period due to contact with maternal blood and secretions, and postnatal period through maternal breast-feeding[4]. A patient with AIDS suffers progressive immunodeficiency and, being more predisposed to infections, will be affected by several opportunistic infections[4,5].

In addition to compromising the immunological system, AIDS also causes changes in the central nervous (CNS). The consequences of CNS involvement in HIV infection can be evident in children since the onset of signs and symptoms or may take many years to manifest. Among the more common manifestations are hyporeflexia, delayed neuropsychomotor development, delayed language acquisition, mental deficiency, pyramidal syndrome, and cerebral palsy[6].

The most common infections occurring in children with AIDS are those of the upper airways, especially sinusitis and external otitis and otitis media. The latter conditions can provoke temporary peripheral hearing loss, which should be identified as soon as possible in order to institute appropriate medical treatment[2]. HIV infection, as well as other congenital infections, seem to be risk factors also for central hearing changes[5]. However, a predominance of middle ear changes is observed in this population[2].

The literature reports that progressive CNS involvement occurs with the advance of the disease, including the auditory system. This fact may lead to abnormal central auditory processing with consequent difficulties in the learning process and in the development of reading and writing[1]. In addition, the integrity of the central and peripheral hearing system is known to be highly important for the acquisition and development of speech and language[5].

Regarding school performance, studies have pointed out that many children with AIDS have learning difficulties. These difficulties, however, may not be exclusively due to HIV infection. The etiology may be multifactorial, including socioeconomic factors, schools with few resources, and lack of stimulation by the parents[7].

Defined as metalinguistic competence, phonoaudiological awareness permits a conscious access to speech at the phonological level and the cognitive manipulation of its representations, being a prerequisite for learning to read and write. This competence consists of the ability to reflect about the sound structure of speech and to manipulate its structural components[8]. It involves the recognition of the fact that words are formed by different sounds that can be manipulated, encompassing not only the ability to reflect (to observe and compare), but also to operate with phonemes, syllables, rhymes and alterations in tasks such as counting, segmenting, joining, adding, suppressing, replacing, and transposing[9].

The relation between phonological awareness and acquisition of written language is not unilateral, but rather reciprocal and has a parallel course. Elementary levels of phonological awareness favor the development of elementary levels of reading and writing, which in turn favor the development of more complex levels of phonological awareness, and so on and so forth, in a reciprocal interaction[10].

A good development of reading and writing skills depends on extrinsic conditions bestowed on the child and these conditions can favor an easier acquisition during this stage of evolution. Among them, exposure of the child to activities that explore the conscious manipulation of sounds can favor the development of written language[11].

Studies have pointed out that there are several levels of phonological awareness: some of them precede the learning of reading and writing and others accompany (or result from) this learning. Learning the alphabetical system is based on the assumption that a person is able to recognize, decompose and manipulate the sounds of speech, an ability that corresponds to phonological awareness. Thus, there is the possibility that a child, before starting the process of language acquisition, already has some metaphonological skills and that, by means of contact with writing, he will develop and refine such skills[9].

The training of phonological awareness improves the skill of preschool readers during the initial grades. Since phonological awareness can interfere in a causal manner with the acquisition and development of the written code, many intervention programs have been developed for the treatment of reading and writing disorders with emphasis on the development of this metalinguistic level[12]. Intervention procedures with training of phonological awareness and of graphophonemic correspondences can be effective in improving performance in tasks of phonological awareness, reading, writing and knowledge of the letters[13].

The tasks for the promotion of phonological awareness skills are relatively easy to implement and can be developed in parallel to reading and writing instruction (intercalated or alternated during each day of class), with mutual benefits for the two repertories. This strategy can be particularly important for students who are at risk of failure in the acquisition of these repertories[12].

The objective of the present report was to characterize the phonological awareness skills of a child with AIDS before and after speech therapy.

CLINICAL CASE PRESENTATION

The present report concerns a case study carried out in

the Speech-Language Pathology and Audiology Sector of the University Hospital, School of Medicine of Ribeirão Preto, Universidade de São Paulo (USP). The study was approved by the Research Ethics Committee of the University Hospital of Ribeirão Preto, protocol HCRP 11132/2008, and was conducted on a 6-year-old girl with AIDS acquired by vertical transmission enrolled in first grade of elementary school. Her parents gave written informed consent for her participation in the study.

A closed therapeutic program focusing on phonological awareness skills was carried out from April to August 2010. On the occasion of the first meeting, the phonological awareness skills of the girl were evaluated by the Phonological Awareness Test – Instrument and Sequential Evaluation (CONFIAS in the Portuguese acronym)[9]. This test involves tasks of syllable and phoneme synthesis, segmentation, identification, production, exclusion and transposition and should be started at the syllable level and later at the phoneme level. Each correct reply is equivalent to one point, with a maximum score of 40 points in the syllable part and of 30 points in the phoneme part, for a total of 70 points.

Audiologic evaluation was also performed. Tonal threshold audiometry carried out with a Unity® audiometer revealed a mild grade bilateral conductive hearing loss. Immitanciometry carried out with a Zodiac® 901 apparatus revealed a type B curve in both ears.

In the pre-therapy evaluation, the score of the child was analyzed for each subtest of the CONFIAS at the syllable and phoneme level (Figure 1). The greatest difficulties were encountered in the tasks of Initial Syllable Identification, Rhyme Identification, Rhyme Production, and Syllable Exclusion and Transposition, especially in the last three, in which the child did not perform correctly in any item. The score for the syllable task was 18 points, with the maximum score being 40 points.

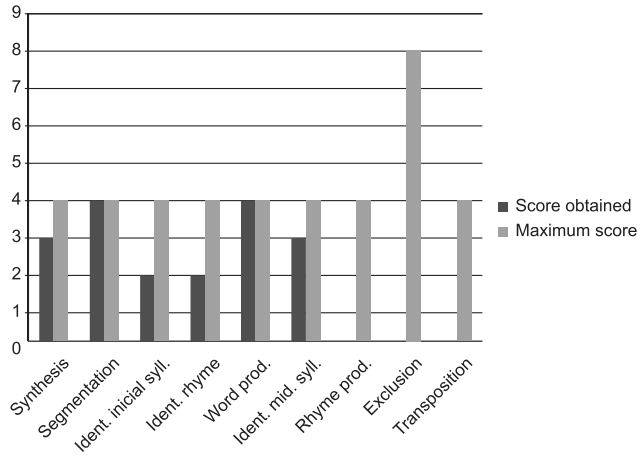

Figure 1. Child's score on CONFIAS tasks at the syllable level in the pretreatment evaluation

Pre-therapy evaluation at the phoneme level revealed a significant difficulty in task execution. The child performed correctly in only one of the four items of the task of Word Production with a Given Sound, with a score of only one point for the tasks at this level (Figure 2). The total score for the test was 19 points, with the maximum possible score being 70 points and the minimum expected score for her writing level was 23.

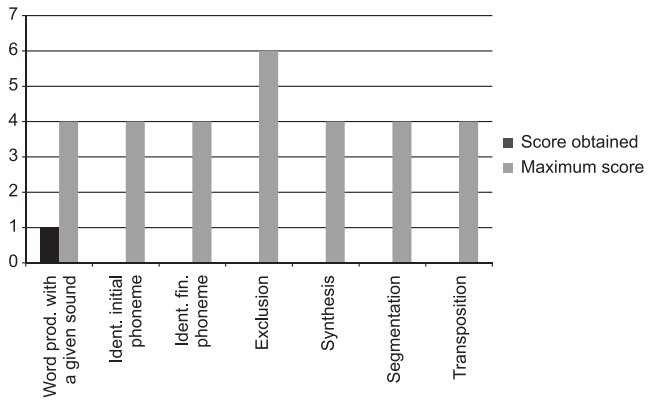

Figure 2. Child's score on CONFIAS tasks at the phoneme level in the pretreatment evaluation

After evaluation, the therapeutic process was started with weekly sessions of 40 minutes. During this period, the child missed four sessions; when the child did not attend the scheduled session, a new session was held during the subsequent week. The following tasks were presented for training during the sessions: syllabic synthesis (one session), syllabic segmentation (one session), identification of the initial syllable (one session), rhyme identification (one session), production of a word with a given syllable (one session), identification of the medial syllable (two sessions), rhyme production (two sessions), syllable exclusion (two sessions), and syllable transposition (two sessions). Care was taken to permit two sessions for tasks for which greater difficulty was observed during evaluation.

Therapy involved activities with figures of children's drawings, the Lynx game (Grow®), geometric figures, colored paper, figure dominoes, memory game, and music, among others. The patient was required to perform awareness tasks regarding the number of syllables using, for examples, beans or wood cubes for visual support of quantity. The manipulation of the syllable was performed in a playful manner by means of the association of figures that started or ended with the same syllable. For the rhyme, children's songs and nursery rhymes were used. Syllable exclusion training was also performed using figures of words belonging to the daily life of the child, showing that a word can be transformed into another when a syllable is removed (e.g.: *cavalo* = *calo*, Portuguese words corresponding to "horse" and "callus" in English) or that another word can be formed if we move the syllables around (e.g.: *cama* = *maca*, Portuguese words corresponding to "bed" and "stretcher" in English). Written material was not used because the child had not yet acquired literacy.

At the end of the established program, the final evaluation was performed and the CONFIAS test was again applied.

In the post-therapy evaluation, the child's performance at the syllable level was better in all subtests compared to the initial (pre-therapy) score, except for the subtest Identification of the Initial Syllable, in which the child showed a higher score in the pre-therapy evaluation by correctly identifying three items in

the first evaluation and only two in the second (Figure 3). The score obtained in the post-therapy evaluation was of 26 points.

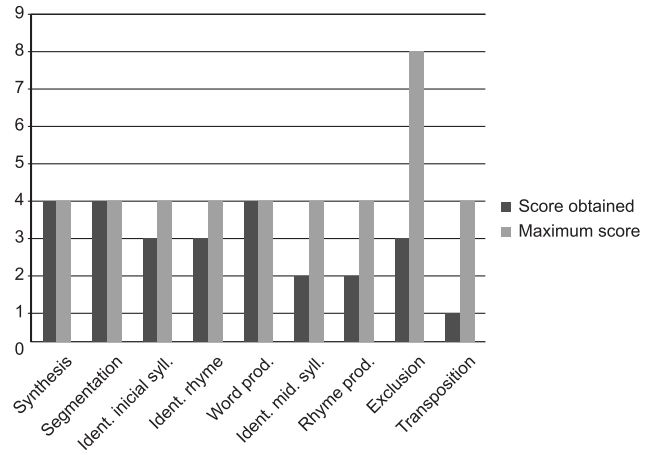

Figure 3. Child's score on CONFIAS tasks at the syllable level in the evaluation after therapy

In the post-therapy evaluation, even though the therapeutic activities were developed at the syllable level, there was also a significant improvement of performance at the phoneme level. In the initial evaluation, the patient performed correctly in only one item of the task Production of a Word with a Given Sound, whereas after therapy she performed correctly in all items of the same task, in addition to all the items of the subtest of Identification of the Initial Phoneme and to three items of the task of Identification of the Final Phoneme. The score obtained in this re-evaluation was of 11 points (Figure 4).

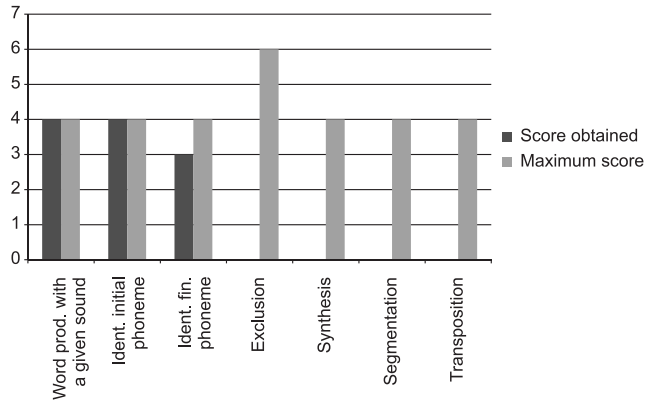

Figure 4. Child's score on CONFIAS tasks at the phoneme level in the evaluation after therapy

Regarding the Total Score for the test, the value obtained at re-evaluation was of 37 points.

DISCUSSION

AIDS was identified in 1981 and has remained endemic all over the world since then. Regarding the pediatric population, with the advent of antiretroviral treatments and of measures for the prevention of vertical transmission, the survival of these children has been constantly increasing[7,14]. Thus, studies are needed about the manifestations and symptoms of AIDS and their implications in the development of oral language and in learning to read and write.

Otologic diseases are particularly common among HIV-seropositive children and, according to literature reports; they may be responsible for delayed language development in this population[15]. Audiologic evaluation of the girl reported here revealed results in agreement with the literature, with mild bilateral conductive hearing loss. Changes in the middle ear were also observed by tympanometry. Conductive hearing loss is usually due to secretory otitis media (WHO) secondary to blockage of the Eustachian tubes with proliferation of adenoid lymphoid tissue, or even due to Kaposi sarcoma in the rhinopharynx[5].

Initially the battery of audiologic tests was supposed to include the evaluation of Central Auditory Processing. However, in view of the detection of peripheral hearing loss, this exam was not performed. The justification for this evaluation is that, as reported in another study, HIV infection, as well as other congenital infections, seems to be a risk factor for central auditory alterations[5].

The acquisition and development of language is understood as a process involving various aspects, among them hearing[5]. Taking into consideration the importance of the integrity of the peripheral and central auditory system for the acquisition and development of speech, language and learning, it is essential to identify and treat both peripheral and central anomalies. Thus, it is possible to improve the quality of life and to provide the essential conditions needed for effective communication between these children and their interlocutors[2].

Regarding the performance of the child in the CONFIAS test, it was observed that the results of the evaluation before the speech therapy program were much lower than expected for the writing level of the girl, with a total score of 19 being obtained. Eighteen of these 19 points were obtained in tasks at the syllable level and only one was obtained in a phoneme task, while the minimum score expected was 23 and six points, respectively.

The literature indicates that supraphonemic activities are more easily executed than phonemic activities, showing that awareness of the supraphonemic segments such as syllables, rhymes and alliterations develop before formal literacy experiences[10]. However, an inferior performance was observed in the present study even in supraphonemic awareness tasks.

As pointed out in the study cited above, there is a vast literature suggesting a strong relation between phonological awareness skills and acquisition of written language. Thus, knowledge about these skills is highly important for a possible intervention and even the prevention of alterations in learning to read and write.

Studies have proposed intervention procedures for the treatment of reading and writing difficulties by direct training of phonological awareness and explicit teaching of rules of graphophonemic correspondence[10-13]. The training of phonological awareness, especially phoneme awareness, can improve the phonological representation of words both for dyslexic children and children with no learning difficulties. In addition, exposing the child to activities that explore the

conscious manipulation of sounds may favor the development of written language[11].

The therapeutic program developed in the present study consisted of activities at the syllable level, with syllable synthesis and segmentation tests, identification of the initial syllable, identification of a rhyme, production of a word with a given syllable, identification of the medial syllable, production of a rhyme, and syllable exclusion and transposition. The results obtained in the post-therapy evaluation proved to be quite satisfactory since the child started to achieve expected scores according to her writing level, with a total score of 37 points: 26 in syllable tests and 11 in phoneme tests.

Regarding the syllable level of the test, an increased score was observed after therapy in the following subtests: syllable synthesis, identification of the initial syllable, identification of a rhyme, production of a rhyme, syllable exclusion, and syllable transposition. It should be pointed out that, before therapy, the child had not given the correct answer to any of these last three tests.

The percentage of correct answers was maintained in the tasks of syllable segmentation and production of words with a given syllable (maximum score in the pre- and post-therapy evaluations). The subtest for the identification of the medial syllable was also attempted, with the child correctly identifying one less item in the post-therapy evaluation, a finding that may be justified as a random occurrence. In the post-therapy evaluation it was possible to observe evolution of the child in tasks at the phoneme level even when therapy was directed at the syllable level.

The effectiveness of speech therapy for the acquisition of phonological awareness skills by a seropositive child was also demonstrated in another study[1]. However, it is important to point out that during the months of speech therapy the child reported in the previous study was already learning to read and write and it has been extensively discussed in the literature that phonological awareness improves as literacy is being acquired. Thus, while the metalinguistic skills are fundamental for the acquisition and development of reading and writing, reading training favors the development of phonological awareness[11].

FINAL COMMENTS

The present study permitted us to characterize the performance of a child with AIDS in phonological awareness skills and to determine the effectiveness of a therapeutic program. The initial difficulty presented in phonological awareness tests was overcome after the sessions of phonological therapy, as clearly proven by the difference between the scores obtained before and after treatment. This demonstrates the importance of the speech therapist as a member of the multiprofessional teams that provide care for HIV-infected children, since this professional is qualified to detect changes in early language in order to intervene and rehabilitate in parallel to drug treatment. In addition, the speech therapist can collaborate with the other health professionals regarding guidelines, discussions and tutorials.

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