

Impact of Central Auditory Processing Disorder (CAPD) on the Academic Performance of Children of Early Childhood Stage: A Systematic Review and Meta-analysis.

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ABSTRACT

Hearing is a vital issue for the adequate development of every child, especially for early childhood children, because it helps in the development of language and speech. Many studies focus on the effect of central auditory processing disorder (CAPD) on the academic performance of children of early childhood stage on various aspects of education. It is well known that children who have been diagnosed with central auditory processing disorder frequently have spoken and written language disorders. Emotional and social problems, as well as issues with academic performance, can result from central auditory processing disorder. Early diagnosis can help overcome those negative impacts. Central auditory processing disorder can affected early childhood children's academic performance in the communication and attention domains, and it may affect academic performance later in life. Researchers have begun to conduct a lot of research on how central auditory processing disorder affects the academic performance of early childhood children. The aim of this paper is to investigate the effects of central auditory processing disorder on the academic performance of early childhood children based on a literature review. This concept paper aims to shed light on the impact of central auditory processing disorder and the challenges that teachers and children can face. The results of this paper show that central auditory processing disorder has negative impacts on the early childhood children's academic performance. These negative impacts can be overcome if we use and adapt suitable training programs earlier.

Keywords: central auditory processing disorder (CAPD), academic performance, early childhood children, A systematic review meta-analysis.

مستخلص البحث:

يعد السمع أمراً حيوياً للنمو المناسب لكل طفل ، وخاصة للأطفال في مرحلة الطفولة المبكرة ، لأنه يساعد في تنمية اللغة والكلام. تركزت العديد من الدراسات على تأثير اضطراب المعالجة السمعية المركزية (CAPD) على الأداء الأكاديمي للأطفال في مرحلة الطفولة المبكرة في مختلف جوانب التعليم. من المعروف أن الأطفال الذين تم تشخيصهم باضطراب المعالجة السمعية المركزية كثيراً ما يعانون من اضطرابات لغوية في مهارتي التحدث والكتابة . يمكن أن ينتج عن اضطراب المعالجة السمعية المركزية مشاكل عاطفية واجتماعية ، وكذلك مشكلات في الأداء الأكاديمي ، كما يمكن أن يساعد التشخيص المبكر في التغلب على تلك الآثار السلبية. كما يمكن أن يؤثر اضطراب المعالجة السمعية المركزية على الأداء الأكاديمي للأطفال في مرحلة الطفولة المبكرة في مجالات الاتصال والانتباه ، وقد يؤثر أيضاً على الأداء الأكاديمي في وقت لاحق من الحياة. بدأ الباحثون في إجراء الكثير من الأبحاث حول كيفية تأثير اضطراب المعالجة السمعية المركزية على الأداء الأكاديمي لأطفال الطفولة المبكرة. الهدف من هذه الورقة هو التحقيق من آثار اضطراب المعالجة السمعية المركزية على الأداء الأكاديمي للأطفال في مرحلة الطفولة المبكرة بناءً على مراجعة الدراسات السابقة. كما تهدف هذه الورقة إلى إلقاء الضوء على تأثير اضطراب المعالجة السمعية المركزية والتحديات التي يمكن أن يواجهها المعلمون والأطفال. تظهر نتائج هذه الورقة أن اضطراب المعالجة السمعية المركزية له آثار سلبية على الأداء الأكاديمي للأطفال في مرحلة الطفولة المبكرة والتي يمكن ان يتم تداركها حال استخدمت البرامج المناسبة في مراحل مبكرة.

1. INTRODUCTION

Central auditory processing disorder is critical to speech and language development, communication, and learning. Children with listening difficulties due to hearing impairment or auditory processing problems continue to be an under identified and underserved population. Children with central auditory processing disorder (CAPD) have problems comprehending speech. The concept of CAPD is often difficult for parents, educators and other specialists to understand. This is because children with auditory processing disorder have normal hearing but parts of the brain which analyze and interpret the sensory information from the ears, do not function appropriately. It's important to shed the light on the differences between hearing and listening. On one hand, hearing is a physiological process involving the detection of sound. On the other hand, Listening can involve an active attentional process that is based on binaural hearing. It can be developed afterwards in childhood and is influenced by extrinsic and intrinsic elements e.g., noise, fatigue, anxiety, motivation and interest, speed of processing.

The peer-reviewed literature and previous studies on the impact of interventions for early childhood students with central auditory processing disorder (CAPD) is critically evaluated. Some support may exist for the claim that auditory and language interventions may improve auditory functioning in early childhood students with CAPD and those with primary spoken language defects. There is little indication that observed improvements are because of the auditory features of these programs. In addition, evidences supporting the effects of these programs on spoken and written language functioning are limited. The evidence base is too small and weak to provide clear guidance to speech-language pathologists faced with treating children with diagnosed CAPD, but some cautious skepticism is warranted until the record of evidence is more complete. Professionals and clinicians who decide to use auditory interventions have to be aware of the limitations in the evidence and take special care to monitor the spoken and written language status of their young clients. (Marc E. Fey et-al .2011).

Auditory development is supposed to be started even before birth. It has potential characteristics that need auditory experience to show them. Central auditory processing disorder (CAPD) refers to the auditory information processing difficulties in the central nervous system. CAPD may coexist with, but is not the result of, dysfunction in other modalities. The most essential related diseases are Attention Deficit Hyperactivity Disorder, autism, Specific language impairment and dyslexia. There is high prevalence of CAPD among

children with recurrent otitis media. Early intervention and referral to audiologist for diagnosis is much important to prevent any academic failure. (Darouie et al 2017).

Academic performance always attracts public and professionals attention because a generation of well-educated youngsters may drive the economic system to become better. By contrast, academic failure is concerned as one of the reasons behind a chunk of repercussions including substance abuse and delinquency. Good achievers students tend to have more motivation to study harder, making them more competitive in the labor market before securing a decent job with a great salary (Zimmerman, 1990). They can be also the main force contributing values added to the human resources, the human capital structure of any economy. In contrast, people who have low levels of academic performance tend to drop out of school, skip classes, etc. (Nguyen et al, 2021)

2. THE LITERATURE REVIEW

The aim of this paper is to investigate the effects of central auditory processing disorder on the academic performance of early childhood children based on a literature review. Children who face troubles using information they hear in academic situations may have central auditory processing disorder (CAPD). These children can hear information but have difficulty attending to, storing, locating, retrieving, and/or clarifying that information to make it useful for academic and social purposes (Katz & Wilde, 1994). This may have a negative effect on both language acquisition and academic performance. To determine the prevalence of central auditory processing disorder (CAPD) and its association with academic performance among early childhood children. CAPD has a negative impact on communication skills, language development, and learning. CAPD practice is highly challenging, as it requires development of specially designed diagnostic test material and adequate auditory training intervention programs with good theoretical background and collaborating multi-disciplinary team.

2.1. DEFINITION OF THE STUDY

2.1.1 Central Auditory Processing Disorder (CAPD)

Palmer S. (2013) defines central auditory processing disorder (CAPD) as difficulty with “processing auditory information in the central nervous system and neurobiological activity that underlies and gives rise to the electrophysiologic auditory potentials” (American Academy of Audiology [AAA], 2010). This processing difficulty results in poor performance in localization and lateralization, auditory discrimination, auditory pattern perception, and temporal processing (American Speech-Language-Hearing Association [ASHA], 2005). Individuals diagnosed with CAPD often face

problems following oral instructions, difficulty in background noise, problems with reading, spelling and language, and academic difficulties (Bamiou, Musiek, & Luxon, 2001; Chermak, Tucker, & Seikel, 2002). Central Auditory processes are the auditory system mechanisms and processes which are responsible for the following behavioral phenomena: sound localization and lateralization , auditory discrimination , auditory pattern recognition ,temporal aspects of audition, including: - temporal resolution - temporal masking - temporal integration - temporal ordering , auditory performance decrements with competing acoustic signals and auditory performance decrements with degraded acoustic signals .Keith (1999) stated that according to the ASHA statement, these mechanisms and processes are presumed to apply to nonverbal as well as verbal signals, and to affect many areas of function, including speech and language. They have neurophysiological as well as behavioral correlates. (Bonnie et al ,2003) Central auditory processing disorder (CAPD) has been defined as: A central auditory processing disorder is not really a hearing impairment of reception and reduced hearing sensitivity. Instead, a central auditory problem causes difficulty in understanding the meaning of incoming sounds. Sounds can get into the auditory system, but the brain is unable to interpret efficiently or at all, the meaning of sounds. In an extreme case, meaningful sounds cannot be distinguished from nonmeaningful sounds." (Flexer,1994). The American Speech-Language-Hearing Association's (ASHA) definitions of auditory processing and (central) auditory processing disorders are provided in Appendix A of this document. Difficulty with auditory processing may be present and may or may not result in a student requiring special education service. If students meet eligibility criteria for special education, it is typically within the disability categories of speech/language (language component) or specific learning disabilities (information processing). CAPDs are disorders that impact language and information processing. Also by definition, CAPDs are not the primary barrier to learning when other disabilities are present, such as hearing loss, cognitive impairments, and autism spectrum disorders. Children under the age of seven cannot be evaluated comprehensively, as language and auditory processes are still developing. Also, the presence of CAPDs cannot be legitimately evaluated when the child's primary language is not English. As with all early childhood students being considered for special education, the team must consider the needs of all children. (Bonnie et al ,2003)

2.1.2 Academic Performance

Many researchers have defined academic performance as an exhibition of knowledge acquired or skills that are developed due to school subjects, which are evaluated through test scores or grades assigned by the teachers of subjects

(Realyvásquez et al , 2020). It has always been linked to the evaluation tests results, which are those corresponding to student's IQ, and leaving aside other personal characteristics. Among such characteristics, the importance of emotional intelligence is worth highlighting (management, facilitation, understanding and perception), dimensions associated to personality traits (emotional impulsiveness, respect for others, sociability, negotiating skills, openness to experience, self-confidence) and, of course, the meaning of life, since the creation of meaning is related to each person's individual development, in hand with other processes such as identity, relationships and life goals. (Noemy et al ,2017)

Academic performance is defined in many ways, depending on personal perspectives of the authors. Some argue that scholastic attainment is simply measured by CPGA (Cumulate Grade Point Average) (Waples & Darayseh, 2005). Other authors, on the other hand, calculate academic outcomes by using a particular test result or year result. (Nguyen et al ,2021)

2.2 Characteristics of Central Auditory Processing Disorders (CAPD)

One of the purposes of this review paper is to describe characteristics of central auditory processing disorders (CAPD) by reviewing the literature in which children diagnosed with CAPD were compared with typically developing children and to determine whether CAPD must be regarded as a deficit specific to the auditory modality or as a multimodal disorder. De Wet et al (2016) searched for peer-reviewed studies investigating children with CAPD in comparison with typically developing peers. Relevant studies were independently reviewed and appraised by 2 reviewers. Methodological quality was quantified using the American Speech-Language-Hearing Association's levels of evidence. Results: Fifty-three relevant studies were identified. The researcher excluded five studies due to the weak internal validity. Totally, 48 studies were included, of which only one was classified as having strong methodological quality. Significant dissimilarities were found between children referred with auditory difficulties and controls. The differences can link to auditory and visual functioning, cognition, language, reading, and physiological and neuroimaging measures. Conclusions: Methodological quality of most of the incorporated studies was rated moderate due to the heterogeneous groups of participants, inadequate descriptions of participants, and the omission of valid and reliable measurements. The listening difficulties of children with APD may be a consequence of cognitive, language, and attention issues rather than bottom-up auditory processing.(de Wet et al,2016)

CAPD can happen when there are problems processing aural information.

Assessment for the disorder should be done by an audiologist that specializes in

CAPD. The negative impacts of CAPD can often be addressed through implementation of evidence-based interventions. Building on definitions of CAPD that suggest problems in the perception and awareness of basic sound comparisons (e.g. temporal and spectral resolution), Moore (2008) examined the ability of large samples of 6-11 year old children to perform relatively simple audiological, auditory processing, speech-in-noise and cognitive tasks. Initial analysis shows that poorly performing children usually respond inconsistently to test items in one or more of these tasks. The proportion of these ‘non-compliant’ children decreases dramatically with increasing age. A second, smaller group of children are ‘genuine poor performers’. They respond consistently, but at a level that is outside the range appropriate for their age. Moore, (2008) examined the performance of both these groups of children on other tasks, including different measures of spatial hearing, attention, speech intelligibility and communication skills.

presented signs and symptoms of CAPD that may include one or more of the following behavioral characteristics: (ASHA, 2005)

- Difficulty localizing sound
- Difficulty to understand spoken language in competing messages, in noisy backgrounds, in reverberant environments, or when presented rapidly
- Taking longer to respond in oral communication situations
- Frequent requests for repetitions, saying “what” and “huh” frequently
- Inconsistent or inappropriate responding
- Difficulty comprehending and following rapid speech
- Difficulty following complex auditory directions or commands
- Difficulty learning songs or nursery rhymes
- Misunderstanding messages, such as detecting prosody changes that help to interpret sarcasm or jokes
- Poor musical and singing skills
- Problems paying attention
- Being easily distracted
- Poor performance on speech and language or psychoeducational tests in the areas of auditory-related skills
- Associated reading, spelling, and learning problems
- Difficulty learning a new language

This list is illustrative, and these behavioral features are not exclusive to CAPD. They may be present with other disorders (e.g., learning disability, language

impairment, ADHD, and autism spectrum disorder). The variability in specific auditory processing skill deficits may contribute to the variability in observed behaviors. (ASHA,2005)

(Bellis, 1996, Chermak et al, 1999) provided common characteristics of CAPD:

- Child behaves as if peripheral hearing loss is present; even though hearing sensitivity is normal
- Child may refuse to participate in classroom discussions or may respond inappropriately
- Child may be withdrawn or sullen
- Child may ask for frequent repetitions, say "what" or "huh" a lot, or say, "I didn't hear you"
- Child may show extreme auditory inattention and may have trouble paying attention
- Child may be easily distracted
- Child requires high degree of external organization in the classroom
- Child may have trouble following complex auditory directions or commands and localizing sound
- Verbal IQ scores are often lower than performance scores
- Child demonstrates significant scatter across subtests assessed by speech/language and / or psycho educational tests, with weaknesses in auditory dependent areas
- Child may show poor reading and / or spelling skills
- Child may have fine and / or gross motor skill deficits
- Child may show poor singing and music skills
- Child may have significant history of middle ear pathology
- Positive family history for CAPD and / or ADHD and / or learning disabilities
- Quite often children with CAPD are misdiagnosed as ADHD therefore an early differential diagnosis is vital.

In addition, children can also present a variety of academic characteristics that may lead teachers and parents to suspect APD. Baran (1998) offers the following characteristics. Again, all children will not present all characteristics.

- * Poor expressive and receptive language abilities
- * Poor reading, writing, and spelling
- * Poor phonics and speech sound discrimination
- * Difficulty taking notes
- * Difficulty learning foreign languages
- * Weak short-term memory
- * Behavioral, psychological, and/or social problems resulting from poor language and academic skills. (Ciocci, Sandra R., 2002)

2.3 Models of auditory processing

Recently, central auditory processing disorder (CAPD) has given rise to two theoretical models: the Buffalo Model and the Bellis/Ferre Model. Jutras et al (2007) examine the applicability of the two models to clinical practice. Neither of the two models was based on data from peer-reviewed sources. The findings indicate that more than 80% of the children could be classified into one of the Buffalo Model categories, while more than 90% remained unclassified under the Bellis/Ferre Model. This contradiction can be explained by the fact that the classification of the Buffalo Model is based primarily on a single central auditory test (Staggered Spondaic Word), whereas the Bellis/Ferre Model classification uses an incorporation of auditory test results.

One reason for mutual miscommunication among researchers who see children with suspected CAPD may be because they adopt various theoretical frameworks. Friel-Patti (1999) noted that audiologists generally tend to subscribe to a pathway model, where there can be some feedback from higher to lower levels of processing, auditory processing proceeds sequentially in the auditory nervous system (Ehret and Romand 1997). Specific tests are administered that focus on a particular level of processing, similar to the process of lesion localization in neuropsychology. A different type of model, called a network model, is described by Medwetsky (2002) in the context of specifying processes involved in perception of spoken language. This can incorporate feed-forward and backward components, and takes into account the impact of higher level processes like language and world knowledge, pattern recognition, synthesized auditory memory and allocation of processing resources by a central executive. This model can incorporate aspects of information-processing that will be familiar to psychologists and language therapists. Although some professionals would disagree with the inclusion of factors that are not strictly 'central auditory', such 'higher-order' domain-general cognitive resources, others would argue that one cannot study the central auditory system in isolation, but must take into account the possible effect on auditory processing these factors have (Cacace and McFarland 2005). For instance, Bellis and Ferre (1999) note that clinical presentation and expectations about the effect of CAPD would be different in an adult with acquired CAPD versus a child with developmental CAPD but with similar constraints on AP. The adult is likely to be an expert language user, a fluent sight reader, have a mature level of world knowledge and have a wealth of top down resources that can be mobilized to support auditory processing. Adults can develop compensatory approaches to deal with their CAPD. The child is still in the process of acquiring skill in language and world knowledge as well as learning the associations between

sounds and letter names involved in beginning to read. While the effect of CAPD can be exactly the same at some levels of auditory processing, the result is likely to be very different depending on the effect of other, not strictly central auditory factors. The interactive nature of the network model highlights that there is a danger of concluding that a child has a CAPD when the primary problem is poor language or weak short-term memory. The researchers who adopt a network model for CAPD argue that the primary deficit must be one of auditory processing, but it is a process which can be impacted upon by a range of top-down factors, like language level and memory. However, although this difference is easy to draw in principle, in practice it can be difficult to sort out which is which. The difficulty arises whenever an attempt is made to take a model from adult neuropsychology and apply it in a developmental context; one is unlikely to find pure deficits analogous to those seen after focal lesions because impairment at one level can affect development of other systems. (Dawes & Dorothy,2009)

In his study Katz J (2016) talked about the Buffalo Model of Central Auditory Processing. This model has decoding of speech as its most basic category. Phonemes are processed in the auditory cortex, which is essential to the speech-language functions of the brain. Powerful phonemic test procedures and therapeutic strategies can help the audiologist diagnose and improve decoding related aspects of speech, reading and other communication and academic difficulties. Decoding is the most popular CAP category of the Buffalo Model. The three basic tests of the Buffalo Model can provide information regarding phonemic decoding due to multidimensional scoring. The Phonemic Synthesis test can provide the most indicators of Decoding. In addition to other Decoding signs; all responses on the battery form a large sample of words and conditions in which errors are analyzed phonemically to compile a Phonemic Error Analysis. This tally is used to direct the Phonemic Training Program (PTP), a powerful procedure for retraining phonemically encoded errors. In addition, the Phonemic Synthesis Training program is used to remediate phonemic issues. Audiologists are concerned with the results of treatments for children with central auditory processing disorders (CAPD). Many questions have arisen to clarify whether treatments provided to children who have undergone training to improve auditory processing can have significant outcomes. The study of Kaul, & Lucker (2016) focused on 20 children who received auditory processing training, completed all statistical analyses to study the results of the auditory processing training provided. Therapy was provided using recorded information with controlled volume settings via the audiometer or through an iPad. The tests and treatment batteries were the same for all children although treatment

procedures were modified and customized for each child. The length of therapy depended on the age and severity of the CAPD as well as how the child responded to the treatments provided. Evaluation and therapy procedures were based on the Buffalo Model. After therapy using a battery of tests based on the Buffalo Model, seventeen different scores were obtained. Besides, the Buffalo Model Questionnaire (BMQ) was administered pre-therapy and post-therapy and findings were compared. Findings indicated significant improvements in auditory processing following therapy for 12 of the 17 measures used. Besides, a trend towards significance was found for two extra measures. Typically, parents reported noticeable improvements in listening, auditory processing, learning, academic performance, and social communication interactions based on the Buffalo Model Questionnaire results. These findings can provide clear evidence that auditory processing training can positively affect auditory processing abilities in early childhood children, and direct treatment services can lead to improvements in auditory processing skills. (Kaul, & Lucker., 2016)

2.4 Central Auditory processing disorder and Academic Performance

program for the development of Ismail (2018) checked the effectiveness of the expressive language skills of children with auditory perception to improve The sample of the study contains a central auditory processing disorder (CAPD). auditory processing disorder; those who received low group of children with language, measurements of auditory perception and skills expressive scores on females), aged between their number has reached 10 children (six males – four mean. The study located in the limits of the 6-9 years, and their intelligence is diagnosis of auditory processing included number of instruments represented in: perception scale, expressive language measure, auditory disorder scale, auditory perception. The study findings included: The program achieved positive results perception to children participating in the program's in the auditory development. It also improved the Group's performance on a scale of expressive language after the application of the program. The positive impact of the group's performance on auditory perception scale, program continued; where the amounted to language measure was not affected over a period of time expressive a month and a half

Central Auditory Processing Disorder (CAPD) does not feature in mainstream diagnostic classifications like the Diagnostic and Statistical Manual of Mental Deficits. Dawes's study (2009) aims to familiarize readers with current controversies surrounding CAPD, with an emphasis on how CAPD can be conceptualized in relation to language and reading problems, attentional problems and autistic spectrum disorders. Different conceptual and diagnostic strategies adopted by audiologists and psychologists can lead to a confusing

image whereby the child who is regarded as having a specific learning disability by one group of experts can be given a CAPD diagnosis by another. While this might be indicative of co-morbidity, there are concerns that different professional groups are using different labels for the same symptoms. CAPD is not a coherent category, but that rather than abandoning the construct, we need to develop improved techniques for assessment and diagnosis, with a focus on interdisciplinary evaluation (Dawes, 2009).

Auditory processing disorder (APD), also referred to as central auditory processing disorder (CAPD), is an umbrella term used for defining different types of disorders that affect the process of comprehending perceived auditory information by the higher auditory centers located in the central auditory nervous system. CAPD is clinically characterized by a difficulty in processing auditory information in the central nervous system. CAPD is observed widely among children and adults. School going children diagnosed with CAPD often experience numerous difficulties such as asking for repetitions, hyperactivity, poor memory, inability to remember any kind of verbal message; thus, affecting the individual's academic performance. It is very important to refer these children, suspected to be suffering from CAPD to the audiologists for an early assessment followed by a proper management of the medical condition, to reduce the risk of academic failure in the affected population. Studies reveal that in CAPD children, the central nervous system does not attain complete maturation resulting in their inability to encode the speech stimuli being presented to them. The results with respect to Mismatch Negativity (MMN) in CAPD children reveals an increased latency and decreased amplitude relative to that of typically normal developing children thus indicating abnormal waveforms, associated with the poor maturation of the central auditory system. Another issue of debate which is based on the relationship between the various aspects of cognition (e.g., intelligence, language, memory, and attention) and APD. As per the British Society of Audiology (BSA), CAPD has been defined as a non-speech (auditory) disorder to differentiate it from linguistic and general (multimodal) cognitive deficits. Despite there being a strong relationship between visual and auditory sensory processing, and between verbal and performance intelligence quotient (IQ), very few studies discuss the effects on cognitive abilities and auditory processing across a range of learning disorders. (Sanju & Choudhury, 2017)

Tawfik, (2017) focused on CAPD practice in Egypt during the last 30 years. Firstly, it started by enhancing Arabic protocols for diagnosis of CAPD in adults, followed by development of Arabic test material for children. Then, it developed the intervention programs based on neuroplasticity of the central

nervous system. An Arabic computer-based remediation program was developed. When applied on children having APDs, it proved to be effective and showed promising outcomes. Assessment & management of CAPD disorders in Egypt have passed through different stages; a long journey where the highly challenging disorder was nicely brought into focus in clinical practice and research.

Central auditory processing disorder (CAPD) can be described as “a deficit in neural processing of auditory stimuli that is not due to higher order language, cognitive, or related factors.” This processing may include skills like auditory discrimination, auditory performance with competing acoustic signals (e.g., understanding speech in noisy environments), sound localization and lateralization, auditory pattern recognition, and temporal aspects of audition (e.g., temporal integration, temporal discrimination, temporal ordering, temporal masking). Children with CAPD have been reported to have difficulty following directions, understanding speech in noisy environments, and discriminating between similar sounds. They may also have problems with reading and spelling. Although there are many definitions of CAPD, there is not agreement among professionals, experts, and clinicians as to an appropriate set of diagnostic criteria. CAPD is not the result of a language or learning disorder or hearing impairment; however, decreased performance in auditory skills can interfere with speech perception and attention as well as contribute to language and/or learning difficulties. CAPD is primarily diagnosed in young children, but it can also be present in adults who were not previously diagnosed with developmental CAPD as children or those who have a diagnosis of “acquired” CAPD as a result of aging, medical conditions, or head-related traumas. (American Academy of Audiology,2010)

3. CONCLUSION

The results obtained in this research make it clear that the academic performance of early childhood students can be affected by the central auditory processing disorder. These results are like those obtained by other researchers. For example, Oselumese et al. (2016), Ismail (2018) , Dawes, (2009), Sanju & Choudhury,(2017), and Tawfik, (2017) highlight that the central auditory processing disorder directly affects the academic performance of early childhood students. In fact, these authors mentioned that students cannot be developed academically unless they are subjected to training programs. Human communicate through taking in complicated perceptual information from the outside world through the senses, like hearing, and interpreting such information in a meaningful way. To communicate also people need certain mental abilities, such as attention and memory. Researchers still do not understand exactly how

all of these processes work and interact or how they malfunction in cases of communication disorders. Although your child can hear normally, he or she may face problems using those sounds for speech and language.

In early childhood children, central auditory processing disorders (CAPD) may be associated with conditions like dyslexia, attention deficit disorder, autism, autism spectrum disorder, specific language impairment, pervasive developmental disorder, or developmental delay. This term has been misapplied to children who have hearing impairment or language disorder but have challenges in learning. CAPD is not considered a sensory disorder, as hearing is intact; it is instead classified as a disorder of the central nervous system (CNS) as the impairment is thought to come from the brain's inability to process the sounds heard.(Moore ,2010)

Academic performance by early childhood children has always been a subject of interest to many professionals. Schools should play a major role in this process. On one hand, some researchers believe that the primary focus of schools should be the academic preparation of the children .On the other hand , others believe that efforts of schools should be integrated with other social institutions such as family and community towards educating children. In fact, schools principals, teachers and parents are primarily responsible for students' academic performance (Darling Hammond, 2000), and that schools should effectively organize themselves towards this mission. (AMPOFO ,2015).The findings of this paper show that central auditory processing disorder has negative effects on the early childhood children's academic performance and that can be solved through using and adapting suitable training programs.

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