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Effects of listening ability on speaking, writing and reading skills of children who were suspected of auditory processing difficulty

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ABSTRACT

Objectives: The aim of this study was to investigate the effects of listening ability on speaking, writing and reading skills of children who was suspected of auditory processing difficulty (APD).
Method: This research was conducted with 67 children in 1st or 2nd grade of primary school. The first group (Group I—control) was comprised of 41 children without APD. The second group (Group II—study group) was comprised of 26 children with APD. Listening, speaking, reading and writing skills were evaluated by Observational Rating Scale (ORS) and analyzed in both groups.
Results: Listening value of ORS in APD group was significantly lower; and, speaking, reading and writing values of ORS in APD group were significantly higher than control group ($p = 0.000$). It was also found that, the main effect of listening skills was on speaking in normal childs, and on writing ability in children with APD.
Conclusion: It was concluded that, for school-aged children, APD can lead to or is associated with difficulties in written language.

1. Introduction

Auditory processing is the ability to listen, comprehend, and respond to information that we hear through our auditory channels. This includes the detection of sound by the external ear and the transmission of sound through the auditory pathways to the brain. Listening, speaking, reading and writing skills of children are important in the development of their communication and language. Every language in the world comprises of four basic principles: it does not matter what sort of language it is, where it is from and how it is structured. They are all made up of reading, writing, speaking and listening. These four principles are intrinsically linked but also very different [1]. "Listening" is defined as an active, focusing process which allows for a quick and precise analysis of sounds that are heard [2]. The foundation on which receptive (reading) and expressive (written) skills are built is spoken language. If the sounds that form the basis of language are not clearly recognized and thoroughly analyzed, this can pose an obstacle to the development of written language skills.

The critical role of listening is a key for the development and enhancement of language and learning skills in the poor listening conditions (e.g., noise backgrounds, distance from speaker, reverberation). Since noise masks speech sounds, decreased speech perception abilities, comprehension of information and academic achievement, increased social–emotional problems are observed [3]. Student's ability to process and analyze the sounds of language may also influence their ability to translate the sounds of language into their written form. Especially, listening ability of the 1st or 2nd grade students affects the quality of both their spoken on written and reading language development. Some children do not understand words and sentences because of the poor listening conditions since certain sounds arrive in reverse order. Poor listening skills are characterized by decreased attention for auditory information, distractible or restless in listening situations, difficulty with auditory discrimination expressed as diminished ability to discriminate among speech sounds (phonemes), deficiencies in remembering phonemes and manipulating them (e.g., in tasks related to reading and spelling, and phonics, as well as phonemic synthesis or analysis) [4–6].

Children with listening-based communication problems are frequently seen to have very poor audio-vocal control or self-listening, confusion or reversal of letters, poor reading comprehension, poor reading aloud, poor spelling and auditory synthesis. Reading is not simply a visual process. It involves the rapid analysis of graphic images (letters), which represent sounds. In other

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words, it is sound which gives meaning to the letter or graphic image. The process of decoding the graphic images or letters into sounds, and subsequently, the recognition of their meaning, is more efficient when auditory processing skills are well developed. Writing may be viewed in a similar way. It is a process in which sounds are translated into graphic form. If the sounds of language are poorly integrated, it is likely to be a disturbance in their graphic reproduction. The ability to spell may be hindered by such an underlying disturbance [2,7].

Language-based learning disabilities are not necessarily those that involve impairments with speech but rather than with the use of language whether it is in speaking, reading, spelling and/or writing. In many researches, it was determined that listening problems directly influenced language in the critical periods of language development (0–3 and 3–6 years) and lowered their success during school age. This result was observed in children having auditory processing disorder (APD) [8]; specific language impairment (SLI) [9]; disorders of language development [10]; poor language and phonological skills [11]; and speech and language problems [12]. Among these disorders, especially in children having APD and SLI, significant listening problems are observed and their success in school is adversely affected. APD describes a mixed and poorly understood listening problem characterized by poor speech perception, especially in challenging environments. The listening performances of 64 children (probably having central auditory processing (Central) auditory processing disorders [(C)APD] but not diagnosed) were obtained from teachers using the Children's Auditory Processing Performance Scale [13].

The central auditory processing disorders [(C)APD] is a deficit in neural processing of auditory stimuli that is not due to higher order language, cognitive, or related factors. Children with [(C)APD] may have spelling, reading, and other academic problems. Auditory processing difficulties become more pronounced in challenging listening situations. This can have a negative impact on both language acquisition and academic performance. The data obtained indicated that the listening performances of these children vary greatly, depending upon the listening conditions and the listening functions being rated.

Typically, screening questionnaires, checklists, and related measures probe auditory behaviors related to academic achievement, listening skills, and communication. At this time, there is no universally accepted method of screening for (C)APD (ASHA). Checklists that ask teachers and parents to observe the child's auditory behaviors may be used to determine a need for the APD evaluation. The parent's description of the child's auditory behavior at home is an especially important contribution to the diagnosis of APD [14,15].

For school-aged children, [(C)APD] can lead to or be associated with difficulties in learning, speech, language (including written language involving reading and spelling), social, and related functions.

In literature, studies related to the assessment of listening skills of children can be seen although they are not sufficient [3,13,16]. However, there is no study in literature about the effect of listening on speaking, writing and reading skills of school age children. In the present study, we investigated the effects of listening ability on speaking, writing and reading skills in 1st and 2nd grade children who was suspected of APD.

2. Materials and methods

2.1. Subjects

Normal children and children with the risk of auditory processing difficulty (APD), attending to 1st and 2nd grade of primary school, were included to the study.

2.2. Selection criteria for normal group and children who was suspected of APD group

All of children (1st and 2nd grade) were selected by their teacher. It was reported that all of the children had average or above-average intelligence and had no history of hearing impairment and IQ by their teacher. According to their teachers, they have normal speak and language (uses voice appropriately, uses sentences oral communication, maintains topic, speaks fluently and talks, for an appropriate length of time, responds to audience on request).

These selected children were applied checklists (Table 1), searching auditory processing difficulty, by their teachers. Checklist was prepared according to both observations on school-aged children attending to our Hearing and Speech Center and literature survey [8,17,18].

If there were $\geq$6 behavioral item, these childs were included into pathological group (children who was suspected of auditory processing difficulty (APD)). If there were $<$6 behavioral item, these childs were included into normal group.

Table 1
For school-aged children, the signs for auditory processing disorders.

1.	Does not seem to hear or listen (this can be intermittent).
2.	Difficulty in receiving and processing incoming messages simultaneously/competing.
3.	Inconsistent responses to auditory information (sometimes responds appropriately, sometimes not) or inconsistent auditory awareness (one-to-one conservation is better than in a group).
4.	Poor listening skills characterized by decreased attention for auditory information; distractible, distractible or restless in listening situations.
5.	Needs instructions to be repeated back.
6.	Difficulty in understanding speech in the presence of background noise.
7.	Deficiencies in remembering phonemes and manipulating them (e.g., in tasks related to reading and spelling, and phonics, as well as phonemic synthesis or analysis).
8.	Need more time to process information, taking longer to respond in oral communication situations.
9.	Speech sound discrimination difficulties, i.e. troubles in understanding what is heard when there is background noise, more than one person speaking, or other sound distractions.
10.	Difficulty following complex auditory directions or commands.
11.	Difficulty in directing, sustaining, or dividing attention.
12.	Difficulty following multi-step directions.
13.	Difficulty following long conversations.
14.	Difficulty in understanding rapid speech.
15.	Have low academic performance.
16.	Have behavioral problems at home or in school.
17.	Difficulty in taking notes.
18.	Difficulty with auditory discrimination (for example, confuses "puppy" with "puffy").
19.	Difficulty in learning songs or nursery rhymes.
20.	Needs to have the same information repeated over and over before they can begin to comprehend.