

## EFFECTS OF EARLY IDENTIFICATION ON COGNITIVE SKILLS AND ACADEMIC ACHIEVEMENT OF HEARING-IMPAIRED STUDENTS

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### ABSTRACT

Early identification is the process of identifying any developmental delays or impairments in the early years of a child's life and realizing the need of early intervention. The cognitive performance and academic achievements depend on the early identification and on the social/educational background of the family. The purpose of the present study was to explore the effects of early identification on cognitive development and academic achievement of hearing-impaired students. This was a descriptive study and survey method was used to collect the data. Population of the study was hearing impaired students taking their education from government special education institutions Faisalabad Division, Punjab, Pakistan. Sample of the study was  $N=200$  hearing impaired students with mild to moderate degree hearing loss which were selected through purposive sampling technique. The age range of students was 12 to 16 years habitual hearing aid users. The Colored Progressive Matrices (CPM) developed by John C. Raven (1936) and Assessment of Academic Performance Questionnaire (AAPQ) were used as a tool of study. It was found out that there was positive correlation among early identification, cognitive skills, and academic achievements of hearing-impaired students. It was concluded that seminars and conferences should be arranged to promote socio economic status of parents by the public and private stakeholders. It was also recommended that a strong awareness campaign must be launched to make the parents about the importance of early identification in the rehabilitation of their hearing-impaired children.

**Keywords:** early identification, cognitive skills, academic achievement, hearing impaired

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## Introduction

Screening of children as early as six months of age is common, however not all cases of hearing loss are detectable at birth. Hearing loss is difficult to detect until well into a child's adolescent years, therefore early detection is crucial. There is an increase in the prevalence of hearing loss in children between the ages of one and five years old. The fact that an infant passed their hearing test at birth does not ensure that they will not acquire a later and/or more severe hearing loss. Therefore, programs for young children, such as Early Head Start, now mandate hearing tests for all new participants (Eiserman et al., 2007). Hearing impaired children having low level of speech and language development, cognitive abilities, social skills, and academic ability if they aren't diagnosed at an early age. Deficits in hearing may lead to a lower socio-economic position, poor social skills, depression, etc. if they aren't remedied (Yoshinaga-Itano, 2003). Early detection of hearing loss means better results for the patient and a quicker return to normal hearing.

Before early identification was defined as "prior to 18 months" or "prior to 30 months," no studies had been published on the infant's development outcomes which are identified in the newborn baby, hearing impaired children may develop skills of language to support them communicate actively and freely think, learn, and behave. An abundance of resources is available to help youngsters. According to the Individuals with Disabilities Education Act (IDEA), for example, all disabled students are guaranteed access to educational services. Federally financed programs such as Head Start and Early Head Start assist low-income families' children better prepare for school (Hebbeler, Spiker and Kahn, 2012).

Before the age of six months, children with hearing loss have a better chance of proper speech and language development if their hearing loss is detected and treated early. Hearing aid fitting and description, auditory training, language development, and educational initiatives depending on the baby's and child's needs and skills should all be part of the proper intervention programmed (Shojaei, Jafari and Gholami, 2016). Speech and language development is greatly influenced by early detection and intervention. Hearing loss severity, IQ, and other impairments are also crucial considerations, as are social and cultural upbringing, the manner in which the mother and child communicate, and the mother's level of literacy. Their technique of communication (verbal or sign language) has an impact on the child's ability to communicate with their parents. A lack of vocabulary, grammatical errors, cognitive challenges, and academic difficulties might come from a lack of early detection and treatments for hearing loss. In addition, children with hearing loss employ shorter and simpler

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sentences, consisting only of nouns and verbs. Children of this age seldom employ words that are useful in their statements. A precise approach must be used to evaluate the expressive and perceptive language skills of hearing-impaired children at each age level (Pooremaeil et al., 2019).

Many variables, such as the degree of the hearing impairment, the availability of resources, professional practices, parents' concerns etc. influence early identification programs for hearing-impaired children. Many early intervention programs emphasize the need to use hearing aids as soon as possible, as well as providing home-based services to model and encourage daily language stimulation. There is a dearth of scientific data to support these principles, as well as information regarding how these guidelines are being implemented in practice today (Turan, 2012).

As a result of a late diagnosis, many hearing-impaired youngsters still lack early access to specialist care. Early intervention has been linked to improved results, according to some research. Others have not been able to corroborate this link, which may be since only a small proportion of children are being identified with hearing loss at an early stage. For children who are profoundly deaf or hard of hearing, the mode of communication (oral or signed) and how it affects other aspects of the program (such as language development, parental guidance, whether or not the child is in a specialized setting) are important considerations in early intervention programs (Martinez-Pacheco, Cierva and Garcia-Purrinos, 2016). Methodological flaws have plagued several research comparing the efficacy of spoken versus signed means of communication.

Process speed, working memory capacity, and fluid thinking are three connected cognitive capacities that grow significantly from infancy to adulthood and that predict individual variations in performance on multiple measures in studies of cognitive development. Researchers have shown that increasing processing speed helps with working memory, which helps with fluid thinking in later life (Pisoni and Cleary, 2003). Learning and cognition may be underpinned in large part by the development of these growing mental faculties. A broad variety of activities, including understanding, following instructions, acquiring vocabulary, solving problems, and taking notes, may be predicted by the variation in these variables (Jantaros et al., 2021). Importantly, academic success is linked to the development of these cognitive talents. Early assessments of executive function in preschool may predict kindergarten math and literacy achievement, and parental perceptions of 4-year-olds' attention span can predict college graduation at the age of 25. When it comes to young children, working memory is linked with arithmetic and reading abilities, as well as with the capacity to do math or science tasks in middle school, according to a new study. As a result, it seems that one's cognitive abilities influence how well one does in school. Even though cognitive skills are seldom explicitly taught in schools, evidence shows that education may help children develop their cognitive abilities (Raghubar, Barnes and Hecht, 2010). Children who attend school for a year or longer are more likely to score better on working memory and executive function tests than those who don't attend school at all, according

to studies using age cutoffs. According to empirical studies, the amount of time students spend in school is associated with an increase in their cognitive abilities and academic accomplishment. Students that attend school are more likely to develop cognitive abilities, according to these findings.

Self-worth and success are now largely determined by one's ability to do well in school. Predicting educational success is a major goal of IQ testing. Various psychometric tests have consistently revealed a strong association between cognitive ability and academic success. Most academic success is predicted by one's cognitive capacity, and this is true for many courses, including mathematics. Educational scholars and practitioners are more interested in discovering characteristics that show efficacy in enhancing student progress as metrics of academic accomplishment become more important. Academic achievement is strongly influenced by a student's cognitive capacity or cognitive talents (Greene, Cartiff and Duke, 2018).

In recent years, the theory of mutualism, which holds that various types of skills and abilities become bidirectional related during human development because of mutually beneficial interactions between previously uncorrelated cognitive processes, has challenged the unidirectional relationship between cognitive abilities and academic performance. Academic accomplishment and the development of cognitive abilities (such as working memory, reasoning, and executive function) have a high link and these cognitive abilities should predict academic achievement over time. Interventions targeting these cognitive abilities should lead to improved academic achievement (Mareva, and Holmes, 2021).

Several studies were conducted to explore the methods and theories of early identification, types and effects in the life of children with hearing impairment. Very rare studies are conducted in Pakistan till date on same theme or topic and surveys were conducted on the early identification of hearing impaired. Early identification is considered as a very private issue, and nobody wants to discuss the challenges their children have been facing. In Pakistan little attention has been carried out to understand the reasons of low outcomes of special education (education of hearing impaired) in Pakistan. Researcher wants to explore the status of early identification of hearing impaired and its relationship with the cognitive abilities and their academic achievement.

Several studies were conducted in Western Countries on early identification and its effects on the lifestyle of hearing-impaired children whereas in the Eastern Countries especially in Pakistan research on early identification and their effects conducted very rare. In the light of this study is most significant in their nature.

## **Objectives of the Study**

The objective of the current study was to explore the effects of early identification on cognitive development and academic achievement of hearing-impaired students.

## **Questions of the Study**

Questions of the present study were:

1. Is early identification affecting cognitive skills of hearing-impaired students?
2. Is early identification affecting academic achievements of hearing-impaired students?
3. Is there a positive relationship existing among early identification, cognitive skills, and academic achievement of hearing-impaired students?
4. Is there any significant difference available in early identification of hearing-impaired students based on demographic variables?

## **Methodology**

This was a descriptive study and survey method was used to collect the data. Population of the study was hearing impaired students having mild to moderate degree of hearing loss, taking their education from government special education institutions Faisalabad Division, Punjab, Pakistan. Sample of the study was  $N=200$  hearing impaired students with mild to moderate degree hearing loss which were selected through purposive sampling techniques. The age range of students was 12 to 16 years habitual hearing aid users. The cognitive skills of the students were tested through the Coloured Progressive Matrices (CPM) developed by John C. Raven (1936). Assessment of Academic Performance Questionnaire (AAPQ) was developed by the researcher and employed to access the academic achievement of students. The reliability of the AAPQ was 0.890.

## Results

**Table 1**

*Demographic variables detail of the respondents*

Sr. No	Variable	Category	Frequency (f)	Percentage (%)	Total
1	Gender	Male	118	59%	200
		Female	82	41%	
2	Parental Educational Level	Literate	50	25%	200
		Primary to Matric	66	33%	
		Matric to Graduate	39	20%	
		Graduate to above	45	22%	
3	Socio Economic Status	<50,000	152	76%	200
		>50,000	48	24%	
4	Living Area	Urban	101	51%	200
		Rural	99	49%	
5	Family Type	Joint	105	53%	200
		Nuclear	95	47%	

Above table No. 1 showed that 59% male and 41% female were the respondents of the presents study. The parent's educational level of the respondents was 25% literate, 33% having primary to matric education, 20% were matric to graduate and 22% of the parents having above graduate degrees. 76% of the guardians of the respondents were earning below 50,000 rupees per month and 24% were earning above 50,000 rupees per month. 51% of the respondents were residing in urban areas whereas 49% were residing in rural areas. 53% of the respondents were part of joint family system and 47% of the respondents were living in nuclear family system.

**Table 2**

*Detail of dependent and independent variables*

Sr. No	Variable	Category	Frequency (f)	Percentage (%)	Total
1	Early Identification	10 Month to 24 Months	22	11%	200
		02-04 Year	98	49%	
		>04 Year	80	40%	
2	Cognitive Skills	Intellectually Superior	19	10%	200
		Intellectually Average	97	48%	

		Intellectually Below Average	84	42%	
		A Grade	18	9%	
3	Academic Achievement	B Grade	100	50%	200
		C Grade	82	41%	

Above table No. 2 explored that 11% of the respondents were identified as having Special Need during 10 months to 24 months of age, 49% of the respondents were identified during the age of 02-04 years and 40% of the hearing-impaired children were identified after 04 year of their age. 10% of the respondents having intellectually superior skills, 48% of the respondents having intellectually average skills whereas 42% hearing impaired children having intellectually below average skills. 9% of the respondents having A-grade as their academic achievement, 50% of the respondents having B-grade as their academic achievement whereas 41% hearing impaired children having C-grade as their academic achievement.

**Table 3**

*Analysis of relationship among Early Identification, Cognitive Skills and Academic Achievement of Hearing-Impaired Children*

**Correlations**

		Academic Achievement	Cognitive Skills	Early Identification
Academic Achievement	Pearson Correlation	1	.858**	.824**
	Sig. (2-tailed)		.001	.000
	N	200	200	200
Cognitive Skills	Pearson Correlation	.858**	1	.820**
	Sig. (2-tailed)	.001		.000
	N	200	200	200
Early Identification	Pearson Correlation	.824**	.820**	1
	Sig. (2-tailed)	.000	.000	
	N	200	200	200

\*\* . Correlation is significant at the 0.01 level (2-tailed).

Above table 3 pointed out that Early Identification has strongly positive relationship with cognitive skill and academic achievement of hearing impaired children. It was also pointed out in this table that Academic Achievement of hearing impaired children, cognitive skills of hearing impaired children and early identification of hearing impaired children having strongly positive correlation with each other and early identification effect on both cognitive skills and academic achievement of hearing impaired children.

**Table 4**

*Analysis of Early Identification of Hearing-Impaired Children based on demographic variables.*

Variable	N	M	df	t	Sig
Male	118	1.9068	198	1.350	.178
Female	82	3.0000			
Below 50000	152	2.1513	198	-9.510	.000
Above 50000	48	3.0000			
Urban	101	1.8317	198	-.424	.470
Rural	99	2.8889			
Joint	105	1.8381	198	1.366	.196
Nuclear	95	2.9263			

*\*P < .05 Level of Significance*

Above table No. 4 showed that there is no significant difference in the early identification of hearing-impaired children on the basis of their gender, living area as well as their family system. It can be assumed that family system, living area and gender of the respondents does not affect the early identification of hearing-impaired children. Whereas the significant difference exists in the early identification of hearing-impaired children on the basis of their guardian socio economic status. The socio-economic status of the family of hearing-impaired children can affect their early identification process.

**Table 5**

*Analysis of Early Identification of Hearing-Impaired Children on the basis of their guardian's educational level*

Groups	Sum of Squares	df	Mean Square	<i>f</i>	<i>Sig</i>
Between Groups	64.817	3	21.606	223.144	.001
Within Groups	18.978	196	.097		

\*P < .05 significance level

Above table No. 5 explored that there is significant difference in the early identification of hearing-impaired children based on their guardian's educational level. It can be accomplished that educational level of the guardians of hearing-impaired children can affect the early identification process.

## Discussion

The present research was accomplished to explore the early identification and its relationship with cognitive skills and academic achievement of hearing-impaired students. Many variables: age of the child at the time of diagnosis, residential area, socioeconomic status of parents, education of parents and family type were taken into account in order to study their effect on learning of hearing-impaired children at schools. Parents' awareness of deafness and early intervention all had a role in improving hearing-impaired children's academic achievement and reducing the negative impact of their handicap on their education. Early detection of hearing loss is associated with improved academic performance and cognitive abilities, according to the findings of this study. Comparable research by Cozett and Roman (2022) found a strong link between academic success and parent-centered services that began when the child was two years old and advised oral communication as a superior auditory intervention method.

Similarly, Daud et al. (2010) claim that hearing loss may be recognized at any age for health reasons, but that failing to identify hearing loss in schools leads to poor school performance and learning failure. Early detection and early management of hearing impairment have a vital role in improving the overall performance of hearing-impaired children in schools, according to this debate.

Iqbal & Sani (2021) found that there is a significant correlation between intellect and deafness. Although a child's cognitive development is constrained because of the constrained learning environment, deafness has an influence on

how quickly they learn. The impact of a constrained environment can be lessened if special needs children are given the correct stimulation and placement utilizing nonverbal assessments. On the grounds of gender and job history, there is less of a significant influence.

## **Conclusions**

It was concluded that early identification of hearing impairment in children has a positive impact on their ability to learn. The researchers also discovered a few challenges parents experienced when trying to detect and analyze a child's hearing impairment at an early stage. The parents of children with hearing loss were not aware of the early identification procedures for hearing loss that are available through technical examination. After early identification of hearing-impaired children, the parents will be able to better cope with the handicap, which leads to better academic and social performance for their children.

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