Journal of Inclusive Education
Vol.5, Issue 1, 2021, 39–56

Effect of Deafness on Cognitive Learning: Comparative Analysis of the Opinion of Secondary School Teachers in Southern Punjab

Muhammad Nadeem Iqbal[1]
Rabea Sani[2]

Abstract

Hearing impairment is a very common disability that is affecting more than 250 million children around the world. Hearing loss or deafness also put an impact on child cognitive learning as children with hearing impairment shows poor academics as compare their normal peer. The basic purpose of this study was to analyze the teacher's opinion about the effect of deafness on cognitive learning and also measure the teacher's opinion about nonverbal tests and their usage in school placement criteria. A self-made questionnaire was used consisting of three sections preliminary information, opinion about the effect of deafness, and the last section contain information about the nonverbal test and their usage for data collection through simple random sampling techniques. Online survey was conducted due to covid 19 privilege in southern Punjab. 81 absolute respondents were taken for data analysis and SPSS version 2020 were used, statistical test such as t-Test ANOVA and mean were used. The results indicate that (90%) teachers were of the opinion that a strong relationship exists among intelligence, achievement, and cognitive development of the child. Results of the study also indicate that (85%) teachers suggest that through the use of assistive technology and proper teaching methodology the cognitive learning can be increased. Discussing nonverbal tests 80% of teachers are of the opinion that children with hearing impairment can pose the same level of achievement as their normal peers in the non-verbal test. 88% of teachers suggest that Augmentative and alternative communication devices

[1] Assistant Professor, Department of Special Education, University of Okara,
Corresponding Author's Email: drnadeem@uo.edu.pk
[2] Department of Special Education, Government of the Punjab,
Email: rabeasani102@gmail.com

include hearing aids, text to speech, picture to speech must be used in the classroom.

Keywords: cognition, deaf, special education, hearing impairment, nonverbal intelligence, cognitive learning, intellectual ability, visual thinking.

Introduction

In a report of the World Health Organization (2020), it is estimated that the prevalence of hearing impairment is 10%. This disability ratio reflects that there are very large numbers of people with hearing disabilities. Hearing loss is the result of impairment in the auditory process and it precludes speech understanding and development. Speech-Language-Hearing Association (2020) reports that mild deaf children or moderate defects in magnitude are likely to be from one of four levels behind their hearing partners. ASHA reports that children who suffer mild to modest hearing loss but are not helped are more likely to fall back due to hearing impairment partners on one or four levels. IDEA (2004) identified hearing impaired students are those who cannot hear and speak including mild, moderate, severe, and profound which affect their educational performance.

The cognitive development of deaf children's cognition or intelligence is multi-faceted. It is a comparative analysis of language and non-language tasks it includes the perception of the student, memory skill of participant, imagery skills, concept formation, learning, and academically achievement, in daily life. It depends on the performance of participants on standardized intelligence tests, the memory skills of participants and conceptual developmental function (Klassen, 2010). Intelligence is about the human being's abilities to cope with a new environment which the person does not have faced and using previous knowledge to gain from the new experience (Peter et al., 2006).

Deaf children need reassurance and proper guidance from parents and educational institutions. A most important factor is the way we use nonverbal gustier cues to give instructions to deaf children to get their attention. It has an impact on student performance. No verbal test is successful only when proper instruction is given to the student otherwise it can be altering the validity and reliability of the test. Deaf children learn how and when to get visual information from their surroundings (Peter et al., 2010). Hearing loss that is not treated often leads to scholastic failure, which can lead to poorer employment and fewer jobs later in life. Communication problems in children can lead to rage, tension, and emotional or psychological consequences for the

entire family. A youngster who is already at risk of damage in low-resource environments is more chance to develop hearing defects in an unsafe environment (Lee, 2007). Evidence shows that lack of spoken language which in turn can result in cognitive deficits but they see the only way of guaranteeing language and preventing cognitive deficits resulting from the absence of language input is by 'sensory restoration' (Mayberry, 2001).

Cognition is known as how our minds think and respond to changes and how we use the previous information in a new context. Intelligence tests reduced the relationship between the degree of hearing loss and performance on language-reduced tests as an indication that the language-reduced tests are more equitable when assessing the intellectual abilities of D-HH individuals (Braden, 2005). Intelligence is considered a multi-factor ability it can be seen in the performance of different tasks. It involves perception skills, memory, how to solve the problem, concept learning and academic achievement, and life adjustment. Deafness affects the cognitive development of some cognitive factors such as academic achievement of children, reading development of children, language development, child performance on standardized intelligence tests, and memorization skills of children (Mayberry, et al., 2000). Several factors can influence deaf children and hard-of-hearing childer's performance when we are measuring the intellectual ability of the child. It also has a concern about the reliability and validity of author-made tests. It also discusses the demographic characteristics found to impact test scores. Several studies showed that verbal test score is correlated with the level of hearing impairments, on the other hand, performance-based tests and obtained scores do not have any correlation (Martha, 2010).

Learning is considered as the main focus in intellectual abilities of a child for his/her improvement in school, educational achievement, and job placement. Literature review suggests different experiences according to the relationship in cognition, deafness, and language development. In this study, the researcher explores the secondary school teachers' opinion of the effect of deafness on child cognitive learning range from average intellectual skill to high-level abstract thinking, and also use of

nonverbal intelligence tests and their effectiveness on school placement criteria.

Objectives of the Study

The objectives of the study were following to:

1. Determine the opinion of teachers towards the effect of deafness on cognitive learning of children with hearing impairment
2. Find out teachers' opinions about deaf children's educational achievement.
3. Evaluate teacher opinion about the current practices of nonverbal intelligence tests in the special education department.
4. Analyze the effect of demographics on teacher's opinion towards the effect of deafness on cognition and nonverbal intelligence

Review of Literature

Nonverbal IQ (also known as performance IQ) is a test that assesses a person's nonverbal reasoning, spatial processing skills, attention to detail, and visual-motor coordination. Nonverbal thought is basically all the other ideas that you're consciously aware of, while verbal thought involves your phonological loop and speech centers, we've identified several regions and their functions in speech processing, but there's still a lot we don't know (Braden, 2005).

Intelligence can be sub categorised into three basic types: the first type of Intelligence is what we generally related to academic ability is called analytic intelligence. Analytic intelligence enables the person to solve problems and get new knowledge. Furthermore, the problem-solving skill has got the information, join them, and compared part of information and get a suitable solution to the given problem solution. The second is creative intelligence, it is about the human being's abilities to cope with a new environment which the person does not have faced and using previous knowledge to gain from the new experience (Hauser et al., 2006).

Intelligence is considered a multi-tasking of our brain. It expresses our capabilities and experience. Hearing-impaired children epistemology is not possible to comprehend until the recognition of the pervasiveness of audiology and its effect on hearing-impaired children. To enhance learning and creating a healthy environment depends on the auditory setting (Peter et al., 2010). Braden (2005) has suggested that researchers normally obtain a verbal IQ score that is not sufficient when our population is deaf. He is suggesting that the measurement of a particular instrument is appropriate for a specific group when a similar type of reliability and validity is found in the same group.

Hearing loss from both ears makes it hard to find the sound or affects the ability to hear in bright surroundings such as a classroom. This deficiency was associated with lower oral scores compared to normal-hearing counterparts. Hearing plays the way people experience, interact with, and connect with people and the environment. the sole function of hearing is building close relationships with family, with friends, and maintaining social relationships (Bauman et al., 2004).

Deafness does not put an impact on the intellectual capacity of the human mind. When compared to the language-developed children and none language children its shows that all children follow the same level of conceptual development and general intelligence. When a child does not have spoken language, the human mind tends to develop its own language as the human mind has numerous language tendencies. If the child doesn't develop expressive language, it invents its ways to get knowledge from visual undercut its effect on the socialization of children (Mayberry, et al., 2012).

Symbolic intelligence is the ability to solve problems that labeling things, organizing them, and categorizing them. In contrast, the Non-symbolic Quotient is a process that reflects the problems solving ability with abstract and normally verbally mediated. The Full-Scale Intelligence Quotient presents the full l cognitive functioning and ability to learn and to gain new information from the environment (Martha,2010).

It is argued the test has accurately assessed non-verbal intelligence in children and adults than which it was developed. The final approach that deals with cultural, language, race bias in

the assessment of ability, is directly linked to nonverbal intelligence. It affects statistically and using the instrument in a way. So, it meets the psychometric standards in psychology in equivalence stander (Bass, 2000). The suitability of the learning environment is essential for deaf students. Students using auditory aids may have a hard time adjusting background noise to hear the important thing. Many suitable measures should be taken for better sounds in a classroom, including carpeting, the use of soft furnishings like cupboards, Specifically, all the children were taught with language of signs and spoken language (Mayberry et al, 2001).

Problem-solving is a particular type of knowledge that is associated with reasoning and cognitive strategies of intelligence which used to solve the different types of problems. The focus on key insights of cognitive strategies and argument that there is a difference between problem-solving tasks are normally done and the way that they can be done. The majority of research in psychology, and artificial intelligence has focused exclusively on "visual thinking". a sample meaning of this definition can be "thinking visually" which means doing good on visual tasks on the other hand show poor performance on verbal tasks (Kunda,2013).

Research Methodology

Research Design

The research design for this study was a quantitative survey. The main motivation behind the study was to access the opinion of teachers about the effect of deafness on cognitive learning and the use of nonverbal intelligence tests and further recommendations about teaching children with hearing impairment.

Population

This study was conducted in southern Punjab, all the teaching staff of public and private schools and centers of hearing impairment institutes constitutes the population of this study.

Sample and Sampling Frame

Systematic random sampling technique was used to draw the sample as a list of all teaching staff was available of the secondary school of public and private in southern Punjab. Every 2nd person on the list was taken as a sample of this study.

Table 1

Sampling framework distribution of sample across the southern punjab.

Sr#	Cities	Number of schools	Teaching staff
1	Multan	6	58
2	Lodhran	1	10
3	Khanewal	5	25
4	Vihari	1	10
5	DG khan	5	35
6	Bhawalpur	4	25
	Total	22	163

Source: Special Education Department (2019).

Table 1shows the details of the sampling information of the participants. Results show that most of respondents were taken from Multan city which is about 36% of total population due to large numbers of schools. Khanewal and Bahawalpur have 15 % each of total sampling. DG Khan, have 21% of sample ratio. Lodhran and Vihari has almost 6% of sampling because of low number of secondary schools.

Table 2

Demographic analysis of respondents

Sr#	Respondents	Frequency (f)	Percentage (%)
Gender			
1	Female	63	78%
2	Male	18	22%
	Total	81	100.0

Working experience			
1	1-5 years	45	55%
2	5-10 years	19	23%
3	10-15 years	14	17%
4	15 above	3	4%
	Total	81	100.0
Area of Specialization			
2	MC	10	13%
3	PH	4	5%
4	VI	6	8%
5	HI	61	73%
	Total	81	100.0
School or Centre			
1	Centre	44	54%
2	School	37	46%
	Total	81	100.0

Table 2 illustrate the details of the demographic information of the participants. Percentage illustrates that both males and females participated in this survey. Female teachers are in majority (78 %) as compared to the male participants (22%). 55% of respondent teachers are new with working experience below 5 years. 23% respondent are working experience of 5-10 years. As for as area of specialization concerned, 73% of respondents were from hearing impaired schools.13% percent of respondents were from mentally challenged children's schools.54% of teachers were from centers of special education and 46% percent were from schools. Total respondents were 81 teachers from southern Punjab who fulfill the requirement of data, only a few respondents were not selected due to some basic data omission.

Instrumentation

A self-developed questionnaire was used as a tool for this study. The questionnaire was developed while keeping in view the factors of cognition and nonverbal intelligence. The questionnaire was divided into three sections, the first preliminary section contains the demographic variables,2nd part was consisting of teacher's opinions about deafness effect on cognition based on the

5 Likert scales and the third part was about the assessment of awareness about the nonverbal test and their usage in Pakistan.

Reliability

Reliability of the tool (questionnaire) was established. The reliability and the validity of the questionnaire were calcuIated through pilot test and Cronbach's alpha and to determine the internal consistency of the items.

Table 3

Reliability of tool by calculating cronbach's alpha

Sr#	Category	No of items	Cronbach's alpha
1	Teachers	33	0.81

Table 3 illustrates that there were 33 statenents and there Cronbach's alphavaIue is0.81, which is considered good.

Results

Following results were concluded on the base of data analysis

Table 4

AnaIysis of data by using t-test on the base of gender

Variables	N	Mean	S. D	*T*	*Sig.*
Male	16	110.6	27.19773	-1.119	0.012
Female	62	115.7	12.38907		

*P< .05 Level of Significance

Table 4 illustrates that the significance value is 0.12 was less than the standard value of 0.05, it suggests that there was less significant difference found among the opinion of male teachers and female teachers towards the effect of deafness on cognitive learning.

Table 5

AnaIysis of data by using t-test on the base of work experience

Comparison of Score	df	Mean Square	*F*	*Sig.*
Between Groups	3	446.381	1.698	0.175
Within Groups	77	262.928		
Total	81			

Significance Level **P <.05

Table 5 reflects that the significance value is more than the standard value of 0.05, so results reflect that there is less difference in opinion of teachers on the basis of working experience.

Table 6

A*nalysis of data by using ANOVA on the base of area of specialization*

Comparison of Score	df	Mean Square	*F*	*Sig.*
Between Groups	3	376.81	1.44	0.224
Within Groups	77	265.7		
Total	81			

Significance Level **P<.05

Table 6 indicates that the significance value was more than the standard value of 0.05, so there is a minor significant difference found based on the area of specialization.

Table 7

School /center

Variables	N	Mean	*t*	*Sig.*
School	44	116.6		
Centre	37	111.7	1.347	0.619

*P < .05 Level of Significance

Table 7 illustrates that a less significant difference was found on the basis of the workplace as the significance value is more than the standard value.

Results

The main motivation for this study was to conclude the teacher's perception of the effect of deafness on cognitive learning. While discussing the effect of deafness on cognitive learning of children with hearing impairment, the researcher was trying to analyze the awareness of nonverbal intelligence and its measurements in the special education department. 90% of teachers believed that a relationship exists among intelligence, achievement, and cognitive development of the child. More than 88% of teachers in southern Punjab believe that there is an effect of spoken language on the cognitive development of children. 84% of teachers agreed that due to limited socialization deaf children's cognitive ability is restricted. Teacher perception about deaf children's educational achievement, it is found that 53% of teachers disagreed that students with hearing impairment learn at the same pace as non-disabled peers. 81% of teachers were of the opinion that deaf children pose higher intellectual capacity but they have a restricted environment due to their disability. 84% percent teachers believe that deaf children are emotionally unstable that's why they never show their full strength. It shows that most teachers believe that deafness does not put an impact on cognition it's their restricted environments and social rejection that pose low cognitive skills. More than 80% of teachers were of opinion that deaf students must be taught vocational courses for their better earning and better living.

Discussion

The main consequence of early childhood hearing loss is that it precludes the development and understanding of speech. Does the question arise that whether speech is linked with the child's cognitive development? Whether without the ability to hear complex and logical thinking can be developed? Can the deaf children have 'inner thought' or they can only think symbolically

Do the deaf children have working memory? The use of sign language can develop the same level of mental development. This study was conducted to analyze the deafness effect on cognitive learning. The researcher wanted to made a fruitful discussion about the relationship between achievement and language development. This research is also intended to know the teacher's views about nonverbal tests and their application in school placement criteria in the special education department and role of demographic on teacher's opinion. The discussion of the study indicated that deafness has less impact on child cognitive learning but it's our restricted environment that limited the child ability to learn, lack of early identification and social rejections are the main issues that restrict the child abilities.

80% of teachers are of the opinion that children with hearing impairment can pose the same level of achievement as their normal peers in the non-verbal test. Krivitski et al. (2004) found no differences between scores from deaf and hearing groups, although some differences may exist on the Cube Design subtest.

The use of sign language can restrict the child ability to interact with family dynamics and put an impact on the learning and socialization is restricted regardless of whether family members learn a sign language, a deaf child born into a hearing family always impacts family dynamics simply by the fact that the child is deaf (Knoors, 2012). Early identification of hearing loss, followed by appropriate interventions to minimize the effect of deafness on cognition and cognitive ability is directly linked with language acquisition. So, they must be thought vocational courses that do not need language acquisition. Children who fail to develop spoken langue or have no exposure to language in early childhood can result in delay or disruption in the development of cognitive skills that interweave with linguistic ability. Such children have trouble with verbal memory organization (Rönnberg, 2003) Cognitive learning can be increased through hearing aids as supplying needed information to the child. Deaf children who are unable to access the language or don't have any exposure to spoken language is due to a lack of hearing aids (Curtiss et al., 1994). current practices of nonverbal intelligence tests in the special education department it is found that use of the nonverbal test in school placement is also very important nonverbal tests are valid measures to assess the

intelligence of Pakistani youth as discussed by (Chaudhry et al.,2018). While Analyzing the effect of demographics on teacher's opinion toward the effect of deafness on cognition and nonverbal intelligence there were no effect of demographics found on the teacher's opinion.

Conclusions

Through results, it is concluded that strong relationship exists between deafness and intelligence. Deafness has impact on child learning speed but their cognitive leaning is restricted due to the limited learning environment. If the special needs children are given proper innervation and proper placement by using nonverbal tests, the effect of restricted environment can be minimized. There is less significance effect was found on the bases of gender, working experiences.

Recommendations

As the explored effect of deafness on cognitive learning of children in special education, the researchers' recommendations are discussed below:

- There is a need for strong awareness about deaf children electronic, social, and printed media.
- The process of placing the children needs more attention.
- Timely and subjective early identification is recommended.
- Strong coordination between the special education professionals and psychologists is needed.

References

Bass. N (2000). The Raven's Colored Progressive Matrices Test: A pilot study for the establishment of normative data for Xhosa-speaking Primary School pupils in the Grahams town region. Department of Psychology, Rhodes University, Graham's town.

Bauman, H-Dirksen L. (2008). *Open your eyes: Deaf studies talking.* Minneapolis: University of Minnesota Press

Chaudhry, I. Khalid, S. Mohsin, N. (2018) Validation of Test of Nonverbal Intelligence for Pakistani Youth. *Pakistan Journal of Education. 35*(2), 223-237

Colored Progressive Matrices Test. Journal of Personality and Clinical Studies, 11 (1-2), 17 – 22.

Curtiss, Susan. (1977). Genie: A psycholinguistic study of a modern-day 'wild child'. NewYork: Academic Press

Foreman, P. Kelly, M.& Pascoe, S. (2004). Evaluating the Educational Experiences of Students with Profound and Multiple Disabilities in Inclusive and Segregated Classroom Settings: An Australian Perspective from brain organization in the deaf. Restorative Neurology and Neuroscience 25, 381–90

Giraud, Anne-Lise, and Hyo-Jeong Lee. (2007). Predicting cochlear implant outcome

Hartung, Paul & Subich, Linda. (2011). Developing self in work and career: Concepts, cases, and contexts. 10.1037/12348-000.

Hauser, P. C., O'Hearn, A., McKee, M., Steider, A., &Thew, D. (2010). Deaf epistemology: Deafhood and deafness. American annals of the deaf, 154(5), 486-492.

Hussain, S. S. (2001). Development, validation, and standardization of a group verbal intelligence test in order for adolescents

(doctoral dissertation, Quaid-i-Azam University Islamabad, Pakistan).

IDEA (Individuals with Disabilities Education Act) (2004), Sec. 300.8 (c).

Klassen, Martha S. Cook,(2010). "Examining the appropriateness of nonverbal measures of intelligence with deaf and hard-of-hearing children: a critical review of the literature" The sesand Dissertations. 99.https://digitalcommons.pepp

Knoors, Harry, and Marc Marschark (2012). Language planning for the 21st century:

Revisiting bilingual language policy for deaf children. Journal of Deaf Studies and Deaf Education 17.291–305.

Mahmood, Z. (1991). Intelligence, IQ, and the third world. Pakistan Journal of Psychological Research, 6 (1-2), 31-53mabad, Pakistan.

Pepler D. &Bierman K., (2018). With a Little Help from my Friends—The Importance of Peer Relationships for Social-Emotional Development, The Pennsylvania State University. The Importance of Peer Relationships for Social-Emotional Development - RWJF.

Peter C. Hauser, et all. (2010) American Annals of the Deaf, Volume 154, Number 5, Winter 2010, pp. 486-492 (Article)

Raven, J. C. (1993). Court, JH, & Raven, JC (1990). Manual for Raven's progressive matrices and vocabulary scales—section 2: Coloured progressive matrices. HK Lewis, London, 113.

Raven, J.C., Court, J.H. & Raven, J.C. (1990). Manual for Raven's Progressive rehearsal speed and scanning in deaf children with cochlear implants. In Spencer & Marschark, 328–57.

Rubin, Kenneth &Bukowski, William &Laursen, Brett (2009). Handbook of peer interactions, relationships, and group.

Rönnberg&Jerker (2003). Working memory, neuroscience, and language: Evidence fromdeaf and hard-of-hearing individuals. In Marschark& Spencer 2003, 478–90

World Health Organization(2016). Childhood hearing loss: strategies for prevention and care (http://www.who.int).

Citation of the Article:
Iqbal, M. N., & Sani, R. (2021). Effect of deafness on cognitive learning: comparative analysis of the opinion of secondary school teachers in Southern Punjab. *Journal of Inclusive Education, 5*(1), 39-55

Received on: 11th August 2021
Revised on: 16th December 2021
Accepted on: 16th December 2021