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Research Article

**EFFECTIVENESS OF EARLY IDENTIFICATION OF HEARING
LOSS IN DISTRICT BAHAWALPUR**¹Mehvish Mukhtar, ²Dr Afshan Abbas, ³Dr. Abdul Rafay¹DHQ Lodhran, ²Punjab Medical College Faisalabad, ³Medical Officer, Rural Health Center
Changa Manga, Tehsil Chunia, District Kasur.**Abstract:**

Objective: The objectives of the study were, to determine the effect of early identification of hearing impairment language development and to determine appropriate age for identification of hearing impairment. Method: A predesigned questionnaire form Peabody Picture Vocabulary Test material and observation technique 'was used to collect information from the respondents and to determine receptive and expressive language scores of early and late identified hearing impaired children. Result: 100 respondents were classified into four groups. 6-8 years, 8-10 years, 10-12 years and 12-14/> 12 years. Average scores of early identified children in age group 6-8 - years was calculated as 52% and average scores of late identified was calculated as 42%, in age group 8- 10 years the average scores of early identified children was calculated 60% and of late identified was calculated as 41 %. In the age group 10-12 average scores were calculated as 71 % and of late identified were calculated as 40% and in the age group > 12 the average scores of early identified was calculated as 75% and of late identified was found to be 60%. On the basis of test ppvt applied to determine language scores of respondents, among only early identified cases 54% respondents scored in range 60-80, 28% respondents scored in range 40-60 and 14% respondents scored in range 80-100 and only 4% scored in range 20-30. The most prevalent degree of hearing loss was found to be moderately severe degree of hearing loss as 58% of early identified and 46% of late identified cases were suffering from moderately severe degree of hearing loss. Onset of hearing loss was predominantly sudden 36 respondents from early identified and 41 of late identified cases had sudden onset of hearing loss.

Conclusion: From the findings the inevitable conclusion is that the identification of hearing loss by 6 months of age followed by appropriate intervention is the most effective strategy for the normal development of language in infants and toddlers with hearing loss. Identification of hearing loss by 6 months of age can brought the language skills to normal followed by early intervention.

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INTRODUCTION:

Human by their nature are different from other species because to communicate with each other is one of the unique factor. Communication with each other is process of listening and speaking. Listening occurs through sense of audition and any abnormality in the auditory system leads to partial or complete inability to listen while the condition of inability to hear sound is hearing impairment. Oghalai & Brownell, (2008) highlight the process of hearing as it is a process in which external ear receives the sound and transmit it to the middle ear from there it is further transmitted to inner ear, here the sound signal in the form of electrical impulse transmitted to brain for analysis and any sickness in this whole process leads to deafness or hearing loss.

There are various treatments available in medical science to cope with the hearing loss. However the treatment or therapy can only give best result if the abnormality identified at initial stage and the proper time of intervention of hearing impairment is given by as early as possible early years of life during language developing years of children. Humphries(2012) highlights the time of 0-2 year critical for children to understand and respond to the sounds around them in different ways. But a hearing impaired child is unable to listen and respond to sounds in normal way because of the lack of exposure to those sounds due to the deprivation of the normal process of hearing.

Association of Alexander Graham Bell highlighted definition of detection of auditory impairment at younger age. It is actually a detailed assessment of auditory impairment before starting development of the language of children i.e. before the age of 6 months. It

is suggested in the document that the newborn screening should be completed before the child reaches 1st month of age and if a baby do not pass newborn hearing screening, then the further diagnostic audiological examination is recommended, so that configuration of hearing loss can be examined. After examination if the baby is found with hearing impairment then the baby should have appropriate intervention before 6 months of age.

There are many researches on current status of hearing impairment but definite epidemiology of hearing loss is still unknown in Pakistan. However, in 1991 after the survey report of Jaisi(1991). It was estimated that the rate of spread of this disease was about 10% of the population in our country and about 0.5 million new cases were reported every year in Pakistan. After a survey of 607 children

conducted in 1998 spread of hearing impairment was 7.9%, and 1.6 per 1,000 profound hearing loss of the bilateral level in Pakistan (Elahi, Elahi, Elahi, Elahi, 1998). A recent study reported about the genetic cause of hearing loss that nearly 50% of hearing impairment was of genetic causes, (Qadeer, Junaid, Sobani, et al. 2013). Due to the lack of awareness about early identification through screening of hearing impairment, there is a high prevalence of hereditary deafness in Pakistan (Ali, 2010). However it has been highlighted in the research of Ali (2010) that three things can reduce the rate of by birth hearing loss, early identification through screening to identify carriers, genetic counselling and parental identification.

Statement of the Problem

People in Pakistan generally don't know of the importance of early identification of auditory impairment. And not so aware about the benefits of detection of hearing loss at early age for language development. Keeping in view the problem the present study was designed on the statement "Effectiveness of Early Identification of Hearing Loss in district Bahawalpur".

Objectives of Study

The objectives of the study were as under:

1. To determine the effect of early identification of hearing impairment on language development.
2. To identify approximate age for identification of hearing impairment.

Assumptions

Early detection and treatment of auditory impairment has a significant impact on the evolution of the language of the deaf and hard of hearing children. But unfortunately is most neglected aspect in district Bahawalpur resulting in wastage of important developing years of hearing impaired children.

In south Punjab Pakistan the rehabilitative services for hearing impaired were not conveniently available, firstly because population of south Punjab generally consider deafness as untreatable disorder and hence do not prefer to visit audiologists or speech therapists and secondly due to less being approached by senior doctors and audiologist results in lacking of proper guidance for parents of hearing impaired children.

Research Questions

The study highlighted the answers of the following questions:

What is the impact of early identification of hearing loss on language development?

What is the appropriate age of identification of auditory impairment?

What are the impacts of early identification been identified so far?

Delimitations

The study was limited to district Bahawalpur region only and children below 6 and above 12 was not part of the study.

Methodology

The research was descriptive in nature and data was collected through observation.

Research Design

A survey was designed to collect the information regarding early identification of hearing loss and its effectiveness for hearing impaired children. Observation technique was used to collect the information. The questionnaire was also developed to collect data from the respondents.

Population

All hearing impaired studying at special education institutes of district Bahawalpur belonging to the age group 6-13 years were included in this study.

Sample

Sample size of 100 student was selected by simple random sampling technique from the population.

Research Tool

A questionnaire Form was used to collect data from respondents. Questionnaire including close ended and open ended questions. Peabody picture vocabulary test was adapted and used to measure the language of respondents.

Pilot Study

Research tool was initially applied on 10 students to adapt and validate the test and measure reliability of research tools as pilot testing.

Analysis of data

Data was organized, tabulated and analyzed by computing frequencies, means and percentages and presented in tabular and graphical form in chapter 4.

Operational Definitions

Hearing Impairment

The condition of inability or reduced ability to hear sound due to abnormal functioning of the auditory system. The term hearing loss and hearing impairment was used interchangeably in this study.

Early Identification

Detailed examination of cause and nature of hearing loss by using various tests for the purpose of further treatment planning.

Rehabilitation

It is a therapeutic treatment of a condition like hearing loss to restore the capacity to hear or to make one able to cope the situation.

District Bahawalpur

District Bahawalpur is south part of Punjab Pakistan. It includes Bahawalpur, Ahmad pur, Khairpur, Hasilpur and Yazman.

Language developing years

Important language developing years of a kid normally start from early 2nd year to late 5th year of life.

Analysis of data

The collected data describes the impact of early identification of hearing impairment on language acquisition of 100 respondents.

Descriptive Statistics of Data

Table 1.

Frequency Distribution of Hearing Impaired Children With respect to early and late identification of Hearing Loss (N=100).

Age	Number of children (f)	Early identified children(f1)	Late identified children(f2)	Percentage (%)
6-7	30	14	16	30%
8-9	37	19	18	37%
10-11	26	13	13	26%
12-13	7	4	3	7%

Table 1 shows summary results of number of children in accordance with their age group. This can be seen that 30 % children lye in 6-7 age group among which 14 are early identified and 16 are late identified, 37% lye in 8-9 group and among them 19 are early and 18 late identified children, 26% lye in 10-11 age group among which 13 are early identified and 13 are late identified children and 7 students were of age 12, among which 4 were early and 3 were late identified children. Most of the students were in 8-9 age groups.

Table 2

Distribution of Early Identified Cases with Respect to Age of Identification of Hearing Loss (n=50)

Age of identification (in months)	Number of children (f)	% age
0-6	16	32.00%
7-12	23	46.00%
13-18	4	8.00%
19-24	3	6.00%
25-30	3	6.00%
>30	1	2.00%

Table 2 shows summary of age of children's identification of hearing loss of early identified group of children. The respondent's identification age was classified in seven groups. 32% children among early identified were identified with hearing loss when they were 0-6 months of age. 46% children were identified when they were between 7-12 months of age. 8% children among early identified children were identified when they were 13-18 months of age. 3% were identified by 19-24 months of age, 3% at 25-30 months of age and 2% identified after they were 30 months of age.

Table 3:

Distribution of Early and Late Identified Cases with Respect to Mode of Onset of Hearing Loss (N=100).

Sr no.	Mode of onset	No. of cases early identified n1=50	Percentage=%	No of cases late identifid(N) n2=50	Percentge=% Total=100
1	Sudden	36	72%	41	82%
2	Gradual	14	28%	9	18%

Table 3 shows distribution of early and late identified group of children according to their mode of onset of hearing loss. Table shows most of the cases suffered from sudden type of hearing loss i.e. 72% from early identified group and 82% from late identified group. While 28% from early identified group and 23% from late identified group suffered from gradual onset of hearing loss. Therefore the most common onset was sudden type.

Table 4
Frequency Distribution of Early and Late Identified Cases On The Basis of Involved Ear
(N=100).

Sr. no.	Type	No.of identified children n1	early %	No.of identified children; n2	late %	Total
1	Uni(left)	3	6%	2	4%	5
2	Uni(right)	9	18%	5	10%	14
3	Bilateral	38	76%	43	86%	81
Total		50		50		100

Table no 4 shows type of hearing loss of early and late identified children on the basis of involved ear. Description of affected ear of early and late identified children can be seen with their percentage. Total 5 children among 100 had unilateral left hearing loss. 14 children among 100 had unilateral right hearing loss and 81 had auditory impairment in both ears. Most of the children i.e. 76% among early identified group and 86% among late identified group were suffering from bilateral type of hearing loss.

Table 5

Distribution of Language Scores on PPVT of Early Identified Children with respect to their Age of Identification of Hearing Loss. (n=50)

Sr. no.	Age of identification of H/L	No. of Cases= f	Average scores on PPVT (test)
1	0-6 months	16	87
2	7-12 months	23	82
3	13-18 months	4	72
4	19-24 months	3	69
5	25-30 months	3	47
6	> 30 months	1	33
Total		50	65.00%

Table 5 shows frequency distribution of average scores of cases on language assessment test PPVT with respect to their age of identification of hearing loss. It is clear from above table that earliest identified children had highest average scores achieved on PPVT test administered meanwhile the lowest scores averaged were associated with later identified with hearing loss.

Data Analysis through Reports of Hearing Assessment.

The medical reports of hearing assessment of individual children was collected, analyzed and organized in the form of following table to describe the configuration of hearing loss of early and late identified children.

Table 6.

Distribution of Early and Late Identified Children on The Basis of Degree of Hearing Loss

(N=100).

Sr no	Degree of hearing loss	No of early identified cases=n1	%	No. of late identified cases=n2	%	Total
1	Moderate (46-65)	13	26%	16	26%	29
2	Moderately severe(46-65)	29	58%	23	46%	52
3	Severe(66-85)	8	16%	11	32%	19

The table 5 that children are classified based on the severity of auditory impairment. It is clear that most of the cases had moderately severe auditory loss i.e. 52 of 100 had auditory loss which was moderately severe type among which 29 children were those who were early identified and 23 were late identified children, 29 cases had moderate degree of hearing loss among that 13 were from early identified group and 16 were from late identified group, and only 19 and least cases had severe degree of hearing loss from which 8 were from early identified group and 11 from late identified group.

Graphical Representation of PPVT Test Results.

Peabody picture vocabulary test was administered to obtain language scores of early identified cases.

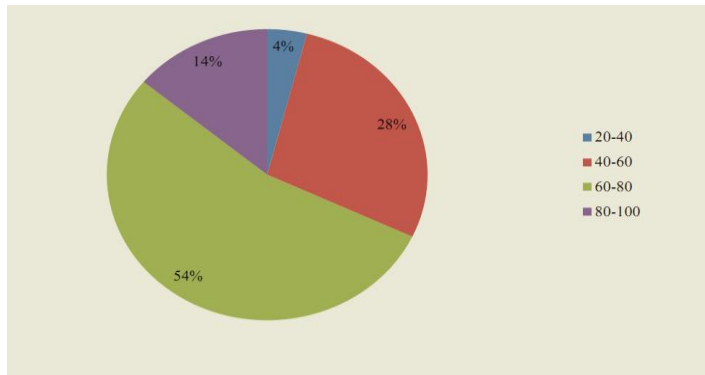


Figure 1: Graphic representation of scores of early identified children on PPVT. (n=50)

Table 7.

Distribution of Early Identified Cases with Respect to The Scores Obtained on Language Assessment Test PPVT in percentage. (n=50)

Sr. No.	Scores(in% age) Test.	on Ppvt No. of Cases=f	Percentage of cases=%
1	20-40%	2	4.00%
2	40-60%	14h	28.00%
3	60-80%	27	54.00%
4	80-100	7	14.00%

Figure 1 shows that among early identified children 54% children scored within range 60-80.28% had their scores in range 40-60.14% children scores were in range 80-100 and only 4% children scored in range 20-40.it is clear that most of the children 54% scores were in range 60-80 and the lowest number of children scored 20-40 on PPVT.

Peabody picture vocabulary test was administered to obtain language scores of late identified.

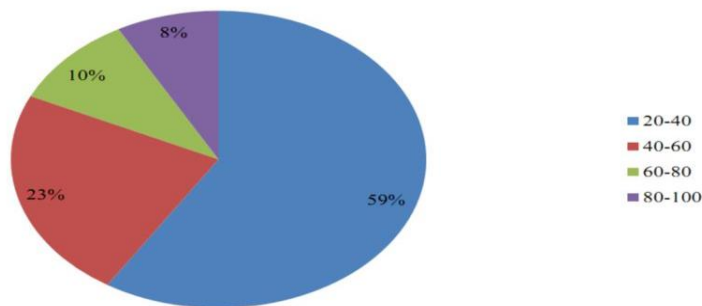


Figure 2.Graphical Representation Of ppvt Scores Of Late Identified Children on PPVT. (n=50)

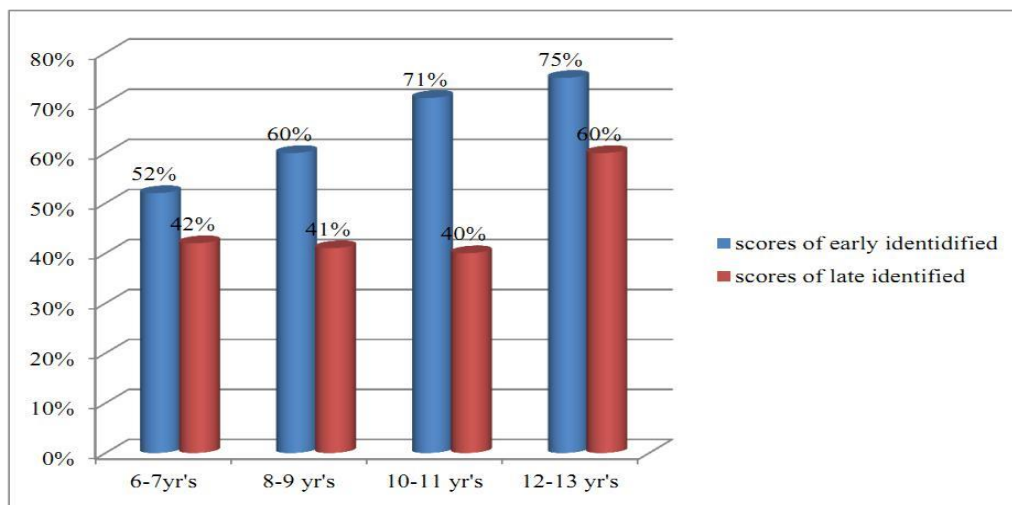
The data of the graph was organized into the tabulated form.
Table 7.

Distribution of Late Identified Cases with Respect to Scores on Language Assessment Test PPVT Obtained in Percentage.

Sr. No.	Scores(in %age) on Ppvt Test	No. of Cases=f	Percentage of cases=%
1	20-40%	29	58.00%
2	40-60%	12	24.00%
3	60-80%	5	19.00%
4	80-100	4	8.00%

Figure 2 shows percentage of children who were late identified, in accordance with their scores on PPVT. This can be seen that 59% of late identified children scored 20- 30, 23% scored 40-60, 10% scored 60-80 and only 8% scored 80-100. Mostly children scored 20-40% on PPVT and least children scored 80-100. Finally data was divided into four groups in terms of their age and analysis was done by

comparing average scores of children on Peabody picture vocabulary test of early and late identified children with respect to their age group represented in the following bar graph.



Graph 1 Graphical Representation of Comparison of Average Scores of Early and Late Identified Children with respect to Different Age Group(N=100)

Graph 1 shows comparison of average scores of early and late identified children of respective age group. It

is clear that average scores on PPVT (Peabody Pitcher Vocabulary test) of early identified children of every age group are better than that of late identified children. Scores are increasing with increase in age of children. Highest scores are obtained by the eldest children in the study.

CONCLUSIONS:

The results of this study indicated that children who were diagnosed with hearing loss in early period of life and had appropriate habilitation services initiated soon after the identification of hearing loss has been developed through normal language skills and were able to keep up with normal hearing peers. It is concluded from the findings of the study that the early identification is directly associated with communication skills growth of auditory impaired children. Early identified children have language advantage that increases with increase in age. The children who were identified late as compared with early identified children, were found far behind them in terms of language development. It is therefore suggested that hearing impairment in children must be identified before the child reaches 6 months of age so the unwanted effect of auditory impairment on language acquisition may be reduced.

DISCUSSION:

The study aimed to measure the effectiveness of early detection of hearing loss in the southern Punjab (neighborhood. Bahawalpur). From 100 cases in this study, 50 people, those that have been identified and intervened before 6 months of age, and the remaining 50 cases were those identified and intervened after 6 months of age. According to researcher significantly higher language scores were obtained by children who were identified or intervened earlier in life as compared with those who were identified later.

The study findings reported first 6 months of life critical for hearing impaired children in terms of identification of hearing impairment and this is supported by the study of Marry Pat Moeller (Moeller. 2000) and (Calderon, Naido.1999). It is concluded in this study that the children identified and intervened by this time of age had language scores in normal range, when they were assessed for language at 6-13 years of age.

But there are also some studies which reported no benefit of early diagnosis on speech language for children with congenital hearing impairment. (Wake, Polakis, et.al.2005). A study by yoshinaga itano, seedy, Coulter, Mehl (1998) reported same results. They determined language skills of 150 children enrolled in habilitation program at age of 13-36 months and found their skills better than those whose auditory impairment was determined after age of 6 months.(Yoshinaga-Itano , Sedey , Coulter , Mehl.1998)

The results of this research are emboldening and point out that early detection is correlated with better

language skills in hearing disabled children. So it is very necessary that all newborns with hearing loss must be selected for hearing assessment before six months of age.

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