



# Age at Diagnosis of Hearing Impairment in Deaf Children Attending Special Schools in South India

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## Abstract

**Background:** Congenital hearing loss is estimated to be 1–6/1000 live births. In India, it is reported to be 5.6/1000 live births. The Joint Committee on Infant Screening 2007 recommends that all newborns be screened for hearing loss by 1 month of age, have diagnostic follow-up by 3 months, and receive appropriate intervention by 6 months of age.

**Objective:** This descriptive study was conducted to determine the age at diagnosis of hearing impairment in deaf children and determine the factors affecting it in South India.

**Materials and Methods:** A cross-sectional questionnaire-based study was conducted on children with hearing impairment (bilateral profound hearing loss) attending 10 special schools in Southern India. The cluster sampling technique was used to collect the data.

**Result:** Our study involved 273 children in the age group of 3–22 years. We found that the mean age at diagnosis of hearing impairment was 23.03(±3.696 SD) months while the mean age at suspicion of hearing impairment in these children was 13.70(±2.13 SD) months. The various factors responsible for the delay in diagnosis were financial constraints, influenced by friends and family, fear, and anxiety. The treatment-seeking behavior among the parents, lack of awareness of clear guidelines among the medical fraternity, and absence of awareness of this problem among the general public also contributed to the delay.

**Keywords:** Hearing loss, age at diagnosis.

## Introduction

According to the WHO estimate in 2012, there were 360 million people worldwide having disabling hearing loss. Deafness is not uniform across the world. In India, 63 million people (6.3%) suffer from hearing loss making it the second most common disability [1]. Congenital hearing loss is estimated to be 1–6/1000 live births [2]. In India, it is reported to be 5.6/1000 live births [3]. Permanent congenital hearing loss creates a social and economic burden on families, society, and country. Delay in the development of communication skills can lead to social isolation and imposes a huge restriction on vocational choices. With early intervention and good family support, these children can be successfully brought into mainstream society.

## Objective of the study

This descriptive study was conducted to determine the age at diagnosis of hearing impairment in deaf children and identify the factors affecting it in South India.

## Materials and Methods

This descriptive cross-sectional study was conducted on 273 children with hearing impairment (bilateral profound hearing loss) attending 10 special schools in Southern India. The cluster sampling technique was used to collect the data. The approval for this study was obtained from the institution's ethical committee. After obtaining the requisite permission from the management of these schools, written informed consent was taken from all the subjects and/or their parents. The data for this study were collected over a period of 12 months. The children were in the age group of 3–22 years. Children with coexisting medical illness, mental retardation or acquired hearing loss were excluded from the study. The data were

collected using questionnaire-based interviews of the parents of these children. In cases where direct interviews were not possible, they were asked to fill up a written questionnaire in their native languages.

## Results and Discussion

This questionnaire-based cross-sectional study on 273 children studying in special schools with bilateral profound sensorineural hearing loss was conducted to find out their age at suspicion and diagnosis. The children in the study were in the age group of 3–22 years. There were 175 males and only 95 females. This may be an indication toward a gender bias in the admission of deaf children to special schools. Family history of hearing impairment was noted in 74 children (27%) in our study. Lemajić-Komazec et al. reported a positive family history of hearing loss in 15.7% in their study [4]. A greater incidence of positive family history in our study may possibly be due to our study population being taken from special schools (greater awareness among parents). There was no family history of hearing loss in 73% of the children; in our study, this

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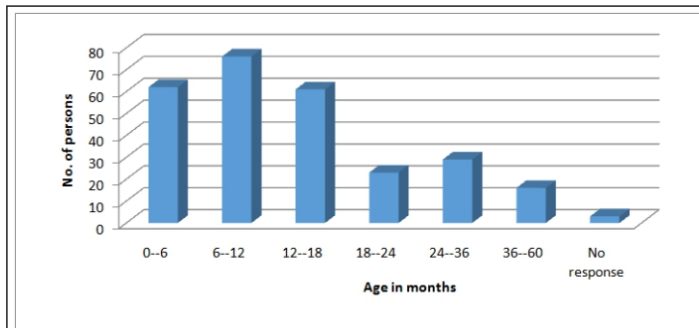


Figure 1: Age at suspicion of hearing loss.

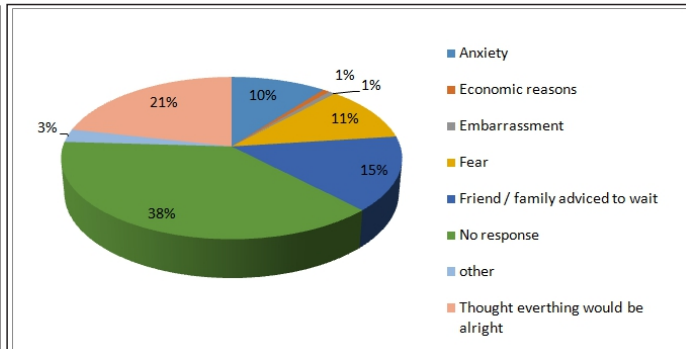


Figure 2: Reasons for delay.

observation indicates that a vast majority of them would have missed detection if high-risk screening for hearing loss was adopted. Similar observations were made by Butler et al.[5]

**Age at suspicion of hearing loss**

In our study, the age at suspicion of hearing loss in children varied from <6 months to more than 36 months. The mean age at suspicion of hearing loss in our study was 13.70(±2.13 SD) months. Most of the children were suspected to have hearing problems by their parents. Parents of 62 children (22.7%) suspected hearing impairment in their children even before 6 months of age while the vast majority were suspected of having some form of hearing deficit around 1 year of age (Fig. 1). The common reasons for suspecting hearing impairment were failure in responding to loud sounds in 78% of the children, delayed speech in 19%, and abnormal speech in 3% of the children with hearing impairment. In a similar study by Jafari et al.,in Tehran, the mean age of suspicion was 12.6months[6]. Ozcebe et al., in Turkey, found a mean age of suspicion of 12.5 months[7]. Himmeland Kruse in a retrospective study also found that 52% of parents had accurately detected hearing loss in their infants [8];these observations are comparable to the findings in our study.

**Age at first medical contact**

In our study, out of the 62 children suspected to have hearing loss before 6

months of age, only 14 were examined by the doctors within the same period while 142 (52%)sought medical attention between 12 and 15 months and 9(3.2%) at above 5 years of age. There was an average of 6 months’ delay between suspicion and the first medical contact. The reasons given for delay in seeking medical assistance included advice from friends and family to wait with the hope that everything would be alright in time, financial constraints, fear, and anxiety (Fig. 2). Butler et al. in a study at university hospital Free State too reported the median age of first medical visit as 40.9 months [5]. In a study conducted in the USA by Sjoblad et al.,the factors causing delay in seeking medical assistance were stated to be problems in getting appointments, illness of the child and difficulties in obtaining adequate ear molds. This signifies the importance of understanding the regional differences in problems faced by children with hearing impairment and their families[9]. In our study,160 of the respondents (59.3%) consulted anotorhinolaryngologist, while 66 (24.4%)consultedpediatrician 11 (10.4%) consulted family physician, and 8 (3%) alternative medicine doctor,respectively. In a similar study in Iran, Jafari et al. reported that parents consulted physicians(57%), audiologists (37.2%), speech therapists (2.3%), or other specialists (3.5%) for the first time[6]. This helps to throw light on the health-seeking behavior in the region.

Tehran, reported the mean age of diagnosis as 15.2 months [6], Van der Spuy and Pottas in their study on 55 congenital deaf children in urban South Africa reported the mean age at diagnosis to be 23 months [10], whereas Butler et al. reported the median age of diagnosis as 44.5 months in a retrospective study conducted in Universitas Hospital, Bloemfontein [5]. Canale et.al in their study, in Italy found the mean age of identification of hearing loss as 20.5 months [11].Our findings are comparable with the findings in other countries worldwide.

**Conclusion**

The Joint Committee on Infant Hearing (JCIH) in their 2007 position statement recommends diagnosis by 3 months of age[12]. Thus, the mean age at diagnosis in our study falls far below the recommendations. However, it is comparable to the existing statistics in other countries. The JCIH recommends universal hearing screening. According to JCIH 2013 position statement, in the US, 98–99% of infants are screened for hearing loss by 1month of age[12]. Universal hearing screening has huge advantages. However,in a country like ours, it is difficult and expensive to implement. Studies on possible means of introducing it in developing countries have been done. Swanepoel de et .al have investigated the possibility of using immunization clinics as platforms for infant hearing screening [13]. Olusanya recommends administration of a well-structured questionnaire at school entry,complemented with parental education as the inevitable option for early diagnosis of hearing loss in developing countries [14]. In a developing country like India with a large population, where unfavorable customs and beliefs toward childhood disabilities have been reported, parental support toward infant screening is

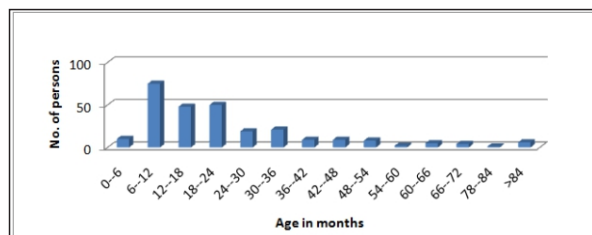


Figure 3: Age at diagnosis of hearing impairment.

**Age at diagnosis of hearing impairment**

The mean age at diagnosis of hearing impairment in our study was 23.03(±3.696), only 10 (3.6%) children in our study were diagnosed of hearing impairment before 6 months of age (Fig. 3). Jafari et al., in

uncertain. Physicians too often account for delays in detecting and intervention. Health education among the general public about the risk factors for hearing loss in a child and

awareness of the availability of screening tests in a neonate will help in early diagnosis. This study highlights the need for a universal screening program in newborns

for hearing impairment. The possibility of using immunization clinics as platforms for delivering infant screening needs to be investigated.

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