Original Research Article

DOI: http://dx.doi.org/10.18203/2394-6040.ijcmph20204374

Prevalence of speech language and hearing impairment in school going children of rural area: a longitudinal study

N. S. Varsha, Sowmiya R., Prasitha P., Jayakumar Praveena*

Department of Audiology & Speech Language Pathology, SRM Medical College Hospital & Research Centre, Chennai, Tamilnadu, India

Received: 21 July 2020 Revised: 07 September 2020 Accepted: 09 September 2020

*Correspondence: Dr. Jayakumar Praveena,

E-mail: praveenaind@gmail.com

Copyright: © the author(s), publisher and licensee Medip Academy. This is an open-access article distributed under the terms of the Creative Commons Attribution Non-Commercial License, which permits unrestricted non-commercial use, distribution, and reproduction in any medium, provided the original work is properly cited.

ABSTRACT

Background: This study aimed on identifying children with hearing, speech and language disorders in rural population that are not identified, diagnosed or rehabilitated yet. The study also focused on collecting a large data with increased study duration to give an appropriate representation of the findings in a rural population.

Methods: Subjective tests were used to screen for hearing, speech and language disorders.

Results: On performing audiological and speech language tests, 130 children were found to have hearing, speech and language disorders out of 1,453 children.

Conclusions: The findings of this study indicate that there is a need to create an awareness and importance in identifying hearing and speech language disorders. This can be done by setting up clinics in rural areas, thus improving the accessibility of these diagnostic and rehabilitative services.

Keywords: Hearing loss, Prevalence, Pure tone audiometry, Rural population, Speech and language disorders, School going children

INTRODUCTION

The prevalence in a statistical population is defined as the total number of cases of risk factor in the population at a given time, or the total number of cases in the population, divided by the number of individuals in the population. It is used as an estimate of how common a disease is within a population over a certain period of time. It helps physicians or other health professionals understand the probability of certain diagnoses and is routinely used by epidemiologists, health care providers, government agencies and insurers.

The National Sample Survey Organisation report shows that in rural India 2.7% are children with hearing impairment in the age group of 0-14 yrs. In the same age

group, the urban statistics are 3.0% and for speech disability its 8.9% and 8.3% of the rural and urban areas respectively. The report also found that Hearing impairment in India was the second most common disability.1 It was also found that when prevalence of hearing impairment was compared among other countries, India had one of the highest prevalence rates of hearing loss in rural areas when compared to the other countries.² Prevalence studies have typically estimated that from 7 to 12% of the elementary school age population have speech defects and about 2 to 4% of the same population have handicapping hearing losses. Hearing impairment is the most frequent sensory deficit in human populations, affecting more than 250 million people in the world. Consequences of hearing impairment include inability to interpret speech sounds, often producing a reduced ability

to communicate, delay in language acquisition, economic and educational disadvantage, social isolation and stigmatisation.³ Both language and speech are essential for sharing feelings, ideas, and information with others. Most young children acquire these communication skills effortlessly, but some experience difficulties in learning to understand and use the language they hear around them. Accurate prevalence figures require an accepted definition of a particular condition and a reliable method for identifying whether or not a child is affected. Speech and language disorders, however, are complex developmental conditions with varied behavioural manifestations.⁴

Parents of children from rural population are unaware of the Speech and Hearing problems or unaware that these problems can be treated and henceforth these children are neglected. Lower socioeconomic status is one other factor which prevents the children being properly assessed and intervened. Such studies on prevalence of Speech and Hearing problems gives us an idea about total number of children affected with various Speech, Language and Hearing problems in different rural areas. Screening of younger children would benefit them with earlier assessment and management. This study can also give us an insight about the necessity of Audiologists and Speech Language Pathologists along with adequate infrastructural facilities in rural areas. Hence, the aim was to study the prevalence of Speech Language and Hearing problems in school going children in rural areas of Chengalpettu district, Tamil Nadu, India.

METHODS

A total of 1,453 children between the years of four to fifteen were screened in the survey. Twenty schools of Chengalpettu district, Tamil Nadu, India, were covered in the survey. All were Government schools which represented the students of lower economic status and the schools had classes from Pre-school to Eighth standard. Children studying in rural government schools from pre-school to eighth standard were included in the study regardless of the presence or absence of any otological history or complaints. Children above fifteen years and below four years were not included in the study. Male and female children were included in the study. This study was carried out for one year, from September 2018 to September 2019. Consent was obtained prior to conducting the tests.

Procedure

Speech and Language skills were assessed using the Verbal Language Development Scale (VLDS – Mecham, 1958). The scale assesses the child's language age by evaluating speaking, writing, reading, and listening skills. Along with formal tests, informal clinical observations on Oral Peripheral Mechanism Examination (OPME), spontaneous speech, narration, picture naming, and picture description were done. OPME was done to check

the structure and functions of the oral structures. Spontaneous speech, picture naming, and picture descriptions was done to check for presence of dysfluencies, misarticulations, and to evaluate voice. GRBAS, a rating scale, given by the Japan society of Logopedics and Phoniatrics was used to rate the individual's voice, where G means the degree of hoarseness, R means roughness, B means breathiness, A means Asthenia, and S meant strain. Each parameter can be rated as 0 (normal), 1(slight degree), 2 (medium degree), and 3 (high degree). If any of the parameter was rated 1 then the child was referred for detailed voice evaluation. If the child's language age with the VLDS assessment was below their chronological age or if there were misarticulations and dysfluencies, the child was referred for detailed Speech Language evaluation. Hearing screening was done using Arphi 500 portable audiometer. The noise level of the environment was checked using the sound level meter in all the schools subjectively. The noise level in all the testing rooms was less than 40dBA and testing was carried out in a closed room devoid of ambient noise. Before conducting the testing, biological subject calibration was used to ensure that the thresholds obtained in the chosen test environment were within normal limits.

Prior to initiating the hearing test an Otosopy evaluation was done to identify any outer ear or middle ear abnormalities. For pure tone audiometry screening the frequencies 500Hz, 1KHz, and at 2KHz at an intensity level of 25dBHL. If the child did hear the stimulus and responded at 25dBHL in all the three frequencies then it was considered pass and if they did not respond at 25dBHLin one or more frequency, then it was considered refer, the child was then referred for detailed hearing assessment at SRM Medical College at Kattankulathur.

RESULTS

This study focussed on identifying the prevalence of speech and hearing problems in school going children in rural areas of Kancheepuram district: such as Maraimalai Nagar, Singaperumal Koil, Chegalpettu, and other areas. Totally 1,453 subjects were screened during the survey. For statistical analysis, percentage of the prevalence of each disorder was calculated from the number of disorderd individuals divided by the total number of children. The results are tabulated below.

Prevalence of speech language and hearing disorders across different age groups

In the range of 4-6 years, 11 children had speech and language problems, 8 children were found to have hearing problems and 4 had other otological problems. In the age range of 7-9 years, 12 were found to have speech and language problems, 21 were found to have hearing problems and 2 had other otological problems. In the age range of 10-12 years, 14 were found to have speech and language problems, 23 had hearing loss and 2 had other

otological problems. In the age range of 13-15 years, 8 children were found to have speech problems, 24 had hearing problems and one child had other otological problem. On total 130 children were found to have speech, hearing and other otological problems from the 1,453 subjects screened (Figure 1).

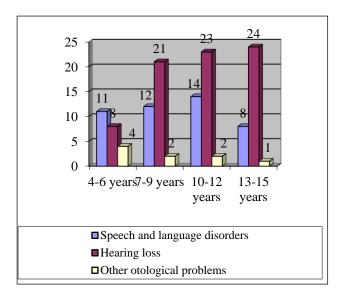


Figure 1: Prevalence of speech language and hearing disorders across different age groups.

Prevalence of a specific disorder

Out of 130 subjects, 34.6% (45/130) had only speech and Language problems, 58.4% (76/130) had only hearing problems and 6.9% (9/130) had other otological problems like ear pain, ear discharge, tinnitus, etc. Out of total 130 subjects with speech and hearing problems, 1.5% (2/130) had cerebral palsy (CP), 5.3% subjects (7/130) had mixed receptive and expressive language delay (MRELD), 2.3% (3/130) had mental sub normality (MS), 10.76% (14/130) had Misarticulation, 1.5% (2/130) had cleft lip and palate (CL&P), 58.46% (76/130) had hearing loss (HL), 12.3% (16/130) had stuttering and 0.76% 1/130 subject had voice problem (Table 1).

In conclusion majority of the children with speech and hearing problems were found to be identified between the age ranges, of 10 to 12 years.

Prevalence of hearing loss in different age groups

Among the total children screened, 76 were found to have hearing problem. The table below explains the total count of children with hearing loss and also explains the total number of children with unilateral hearing loss and bilateral hearing loss across different age groups. Totally 27 children had unilateral hearing loss and 49 children had bilateral hearing loss (Table 2).

Age range (years)	MRELD	MS	СР	Misartic ulation	Stuttering	CL&P	Voice problem	HL	Other otological problems
4-6	3	1	2	5	0	0	0	8	4
7-9	1	1	0	4	5	0	1	21	2
10-12	3	1	0	3	6	1	0	23	2
13-15	0	0	0	2	5	1	0	24	1

Table 1: Prevalence of a specific disorder.

Table 2: Prevalence of hearing loss in different age groups.

Age range (years)	Unilateral hearing loss	Bilateral hearing loss
4-6	2	6
7-9	7	14
10-12	5	18
13-15 Total	13	11
Total	27	49

Table 3: Prevalence of specific other otological problems in age groups.

Age range (years)	Ear pain	Ear discharge	Tinnitus	Ear wax	Total
4-6	-	-	-	-	-
7-9	-	-	-	-	-
10-12	-	1	1	1	3
13-15	4	2	-	-	6
Total	4	3	1	1	9

Prevalence of specific other otological problems in age groups

In relation to specific other otological problems across different age groups, it has been found that nine children had other otological problems out of 1,453 subjects (Table 3).

DISCUSSION

This study focussed on identifying the prevalence of speech and hearing problems in school going children in rural areas. Communication disorders are potentially disabling conditions with widespread and lifelong implications. In our study, it was found that the prevalence of Misarticulation (10.76%), Stuttering (12.3%) and hearing impairment (58.46%) was more between the age group of 4-15 years. Mostly otological problems and communication problems are seen because of unhygienic conditions were they are prone to more infections. It was reported that, 10% of population have speech, language, and hearing problems in which 6% have speech and language problems. These factors can very well affect the Communication of the subjects which can have an impact of social and emotional well-being, cognition, and behaviour.5 All these three conditions are more prone to be caused due to the environmental influence in the rural area. In case of Hearing impairment, the condition of mild – moderate conductive was seen in most of the patients. This could be again due to unhygienic conditions where the children are more prone to infections. In school going children the communication disorders can have an impact on academic achievement in the school years and affect vocational choices later in adulthood. It is also observed and reported that people with communication disorders are more likely to be unemployed or in a lower socioeconomic status than are people without disorders. Prevalence estimates are not, however, particularly valuable in and of themselves. Rather, they provide key starting points for other important inquiries about childhood speech and language disorders.6 Lifespan prevalence data are valuable in understanding the natural history, course, and prognosis of these disorders. Prevalence estimates also allow for assessment of possible risk and protective factors. For example, a family history of speech and language disorders may increase risk for childhood communication disorders, whereas high quality day care experiences may decrease risk, acting as a protective factor. Risk and protective factors provide hints on causality of the disorders, as well as on prevention or intervention strategies that might help to reduce their adverse impacts on individuals and society. The key research questions below focus on the prevalence of three common types of childhood communication disorders (language, speech sound, and stuttering). In a systematic review of research on the prevalence and natural history of childhood speech and language disorders and surprisingly noted that prevalence estimates for language disorders varied widely, depending on the age of the children sampled and the criteria used to identify cases.⁷ In the prevalence study of speech sound disorders, they found that in children of five, six, and seven year old children the prevalence rate were as low as 2.3% and as high as 14.5%, probably reflecting the varied methods for identifying cases.

CONCLUSION

The survey was conducted to find the prevalence of Speech Language and Hearing problems in school going children in rural areas of Chengalpettu district, Tamil Nadu, India. 130 subjects were identified to have Speech and Hearing impairments out of total 1,453 subjects screened. Misarticulation, Mental retardation, stuttering and hearing impairment was identified to be more than any other disorders. These problems are more prone to cause both communication and academic difficulties. Because of this factor, these children have to be focussed at the earliest. But considering the income status, awareness of these disorders, and accessibility of these services, there should be well established centres in these rural areas to identify and rehabilate these disorders at the earliest.

ACKNOWLEDGEMENTS

We would like to thank Head of the Department, Dr. D. Balakrishnan, and Dean (Medical), Dr. A. Sundaram for giving us the opportunity to conduct this study and for publishing it.

Funding: No funding sources Conflict of interest: None declared

Ethical approval: The study was approved by the

Institutional Ethics Committee

REFERENCES

- National Sample Survey Organization. Disabled persons in India. NSS 58th round (July-December 2002) Report no. 485 (58/ 26/1). New Delhi: National Sample Survey Organization, Ministry of Statistics and Programme Implementation, Government of India, 2003.
- 2. Mathers, Colin & Smith, Andrew & Concha, Marisol. Global burden of hearing loss in the year 2000. Global Burden of Disease. 2000:18.
- 3. Taylor CL, Brooks RP. Screening for hearing loss and middle-ear disorders in children using TEOAEs. Am J Audiology 2000;9(1):50-55.
- 4. Lubker BB, Tomblin JB. Epidemiology: Informing clinical practice and research on language disorders of children. Top Lan Dis. 1998;19(1):1-26.
- 5. Lewis BA, Freebairn LA, Taylor HG. Academic outcomes in children with histories of speech sound disorders. J Commu Dis. 2000;33(1):11-30..
- 6. Enderby P, Pickstone C. How many people have communication disorders and why does it matter? Advances in Speech-Language Pathology 2005;7(1):8-13.

- 7. Law J, Boyle J, Harris F, Harkness A, Nye C. The feasibility of universal screening for primary speech and language delay: Findings from a systematic review of the literature. Develo Med Child Neurol. 2000;42(3):190-200.
- Beitchman JH, Nair R, Clegg M, Patel PG. Prevalence of speech and language disorders in 5year-old kindergarten children in the Ottawa-Carleton region. J Speech Hearing Dis. 1986;51:98– 110
- 9. Cantwell DP, Baker L. Prevalence and type of psychiatric disorder and developmental disorders in three speech and language groups. J Commu Dis. 1987;20(2):151-60.
- Johnson CJ, Beitchman JH, Young A, Escobar M, Atkinson L, Wilson B, et al. Fourteen-year followup of children with and without speech language impairments: Speech language stability and

- outcomes. J Speech Language Hearing Res. 1999;42(3):744-760.
- 11. Mc Kinnon, DH, Mc Leod S, Reilly S. The prevalence of stuttering, voice and speech sound disorders in primary school students in Australia. Language, Speech, Hearing Services Schools. 2007;38(1):5-15.
- 12. Mc Leod S, Mc Kinnon DH. The prevalence of communication disorders compared with other learning needs in 14,500 primary and secondary school students. Inter J Language Commu Dis. 2007;42(S1):37-59.

Cite this article as: Varsha NS, Sowmiya R, Prasitha P, Praveena J. Prevalence of speech language and hearing impairment in school going children of rural area: a longitudinal study. Int J Community Med Public Health 2020;7:4043-7.