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Original Article

Prevalence of communication disorders in a group of islands in India

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ABSTRACT

Background: Lakshadweep is a union territory of India which is a socially and geographically secluded part from the main land giving rise to increased inbreeding; one of the causes for the communication disorders. Information about prevalence of communication disorders is essential for the prevention, policy decision making and providing effective rehabilitation services. The study was conducted as a part of fieldwork by staff and students of the AIISH to estimate the prevalence of communication disorders in Lakshadweep.

Method: A door to door survey was conducted in 5 islands (surveyed population: 22,558) of Lakshadweep to identify the population at risk for communication disorders. Those who were at risk were screened to identify the same in the second phase. Screening was conducted in camps held at three islands. The prevalence of communication disorders was then estimated for the at-risk population.

Results: The percentage of individuals who were at-risk of communication disorders as estimated from the survey data was found to be 3.63%. Among those who appeared for the screening camp 42.64% of individuals were found to have ear related problems and 57.36% individuals had speech–language disorders. Also, males had higher prevalence of ear related (53.77% against 46.23%) and speech language related problems (60.29% against 39.71%).

Conclusions: The prevalence of hearing loss was lesser and the prevalence of speech–language disorders higher compared to the mainland. Among the communication disorders, speech and language disorders were more prevalent. Males were more prone to the communication disorders than females.

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1. Introduction

Communication is a basic need of human beings and is necessary for the emotional and social well-being of a person. ASHA¹ states communication disorder as “an impairment in

the ability to receive, send, process and comprehend concepts or verbal, nonverbal and graphic symbol systems”. Communication disorders not only limit a person's ability to convey information, but also hinder his/her social participation and results in stigmatization. In addition, high incidence and prevalence of communication disorders can have impact on

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the social, economic and productive life of a country due to its adverse effects.² Prevalence of communication disorders is the number of people in a population who have the disease of interest in a particular time period. Information on prevalence of communication disorders is crucial for a country as it can indicate the measures to be taken to reduce the burden of effect of communication disorder on individuals. The information of prevalence may also be essential for policy makers to create policies which can assist the individuals with communication disorder to get integrated in main stream through rehabilitation programmes and to provide them a life with dignity and identity.

India is the second largest populated country in the world and is still a developing nation. Prevalence of communication disorders in India is found to be higher in comparison to that of developed countries.^{3–7} In their study Konadath et al.⁸ has revealed prevalence of at risk population for communication disorders to be 6.07% in the rural part of India in a population size of 15,441. The study also revealed a higher proportion of the population to have hearing related disorders (90.58%) than speech language disorders (9.42%). The review article written by Garg et al.² about the prevalence of hearing loss in India also reveals prevalence to range from 6% to 9%. In comparison, the studies conducted in developed countries like New Zealand, United Kingdom, United States, show a lower prevalence of communication disorders. Studies conducted in developed nations show prevalence of speech–language disorders to range from 0.5% to 7%^{3–6} and they noted prevalence to decrease with age. The prevalence of hearing loss in developed nation is found to range from 0.05% to 0.23%⁷ which is lower than that found in developing nations like India.

In an international context the difference in prevalence of communication disorders may be attributed to the economic status, population size, race, ethnicity, access to health care facilities and methodological factors like definition of communication disorder and age range of subjects.⁸ However, when a country like India is considered with high diversity, we can expect difference in prevalence across different parts of India owing to the cultural, social and the geographical factors. In India there is dearth of studies exploring these effects on the prevalence of communication disorders. In addition, Lakshadweep is a rural part of India which is geographically and socially separated from the mainland. Hence, the current study is conducted to see the differences and similarities in the distribution of communication disorders in Lakshadweep (which is a group of islands off the coast of south-western part of India) in comparison to the mainland.

2. Method

The study was conducted with the aim to estimate the prevalence of communication disorders in six islands of Lakshadweep. Lakshadweep is the smallest union territory of India under direct administration of the Central Government. The total population of Lakshadweep is 64,429 according to the 2011 Census of India.⁹ The Islands that were covered in the study included Andrott, Amini, Agatti, Kavaratti, Kiltan and Kadmat with a total population of 46,951 (24,078 males and 22,873 females).⁹ The islands were selected based on the

convenience of coverage of islands and as these islands had higher population among other islands.

The study was carried out in two phases. In first phase door to door survey (in five islands) to identify the individuals who were at the risk of communication disorders was carried out and in second phase evaluation camps were carried out (in three islands) to screen the identified population who were at risk. Both door-to-door survey and camp were conducted in two islands namely Andrott and Kiltan. Stated otherwise, individuals identified to be at risk having communication disorders as per the survey in Amini, Agatti and Kadmat were referred to camps conducted at Kiltan and Kavaratti as these islands had smaller population and the participants had easy access to the camp locations. In Kavaratti survey was not conducted due to time constraints. The door to door survey, the evaluation and habilitation/rehabilitation services to the participants who attended camp was given with the financial support provided by All India Institute of Speech and Hearing (AIISH), Sarva Shiksha Abhiyan (SSA), Lakshadweep and NSS, University of Mysore.

2.1. Participants

A total population of 22,558 individuals were surveyed for the presence of communication disorders. The participants of the study were native residents of Lakshadweep islands and individuals in the age range from birth to 100 years participated in the study. During survey information was collected from individuals above the age of 5 years. For children (<15 years of age), the information provided was substantiated by the adults in the household. Participants from Andrott, Amini, Agatti, Kiltan and Kadmat participated in door to door survey and individuals referred from all the six islands took part in the evaluation camp conducted in Andrott, Kiltan and Kavaratti.

2.2. Procedure

In phase I of the study, door to door survey was conducted by 48 NSS volunteers and six staffs of AIISH. The volunteers were graduate (BASLP) and post-graduate (Audiology/Speech–language pathology) final year students. The staff involved in the survey belonged to different departments of the institute with educational background of either Masters in Speech language pathology or Audiology or Clinical Psychology except the ear mould technician. An orientation regarding the information to be collected during the survey was given to all team members before the commencement of survey by the Camp in-charge.

The survey was conducted to identify the population who were 'at risk'^b of communication disorders in the aforementioned islands with the help of a general questionnaire prepared for the same (Appendix I). The general questionnaire was used to collect information regarding the number of residents in the house, and the number of members at risk of communication disorders. When the presence of a person who

^b At risk population was defined as those who had potential pre, peri or post natal risk factors (in children <2 years of age) or as those who had minimum more than 1 signs and symptoms of communication disorders as included in the screening checklist.

was 'at risk' of communication disorders was suspected, standardized 'Modified High Risk Register' (HRR) for professionals¹⁰ was administered to get the possible causative factor, medical and family history, along with the demographic details. The details of the questions embedded in the HRR were as follows.

Initially information regarding the age, socio-economic status, educational background, and occupation were collected as demographical data. With respect to medical history and causative elements, the HRR encompassed excessive vomiting (>5 months of gestation), elderly pregnancy, high/low blood pressure, high/low blood sugar, history of abortion (second pregnancy within 6 months of abortion), Rh incompatibility, viral/bacterial infections, chemical fumes exposure, maternal alcohol consumption, smoking, intake of ototoxic medication during pregnancy as prenatal factors. Low birth weight (<1.5 kg), neonatal jaundice (requiring blood transfusion), delayed birth cry (>20 s), premature delivery (before 37 weeks of pregnancy), birth asphyxia, foetal distress, aspiration of amniotic fluid, abnormal delivery (instrumental), Neonatal Intensive Care Unit (NICU) admission (>5 days) were covered under natal factors. Post-natal aspects covered presence of craniofacial/structural anomalies, congenital anomalies, degenerative diseases (progressive decline in speech–language skills), viral/bacterial infections, convulsions, poor vegetative skills, history of Acute Suppurative Otitis Media or Chronic Suppurative Otitis Media (ASOM/CSOM), head or neck trauma, Cerebro-Vascular Accidents (CVA), functional/psychological problems (hyper activity, affected social behaviour), vocal misuse/abuse and noise exposure. Positive family history for communication disorders, consanguinity and type of delivery were also considered to be high risk factors. Individuals who were found to be at risk of communication disorders during the door to door survey were further referred for evaluation during phase II.

In phase II, screening camp was carried out at Andrott, Kiltan and Kavaratti Islands for the individuals who were identified to be at risk of communication disorders during the door-to-door survey. 339 individuals attended the second phase of the camp from the referred population. Screening of individuals was carried out using a battery of tests to arrive at a probable diagnosis and all tests were carried out in school premises. Whenever detailed evaluation was indicated, participants were referred to AIISH (mother institute) as there were no qualified professionals in the same field available in the regions of the study. AIISH being a central government institution specialized for treating such population provides access to multiple professionals under the same roof and at economical rates.

The tests to be administered were selected based on the information collected from the HRR. Those who complained of ear-related problems consulted an ENT specialist as the first step, where detailed case history and otoscopy examination was carried out and then underwent audiological screening if they complained of hearing related difficulties. Audiological screening comprised of Pure-tone audiometry and Immittance evaluation which were carried out by the student volunteers under the supervision of a qualified Audiologist. Air conduction thresholds were obtained for 0.5 kHz, 1 kHz, 2 kHz and 4 kHz pure tones and bone conduction thresholds were

obtained for 1 kHz, 2 kHz and 4 kHz pure tones using portable type-II audiometer. High frequency air conduction thresholds were not included in the procedure due to time constraints. Nevertheless, individuals who reported history of noise exposure or probable ototoxicity were referred to AIISH for detailed evaluation. Immittance evaluation was conducted using Type 3¹¹ Immittance meter. The screening could not be conducted in a sound treated room due to minimal resources since the set up was in school premises. However, the environmental noises in the testing room were restricted to as minimum as possible and biological calibration was used to account for the environmental noise levels and any instrumental errors. Bone conduction thresholds were not obtained at low frequencies (250 and 500 Hz) as there was a wide variation in the calibration factors which was possibly due to the irrepressible environmental factors. Modified classification system¹² given by Clark (1981) was used to classify the degree of hearing loss.

Individuals with speech and language complaints were evaluated by student volunteers under the supervision of qualified Speech-language pathologists. Standardized screening tools and tests such as Receptive Expressive Emergent Language Scale,¹³ Frenchay Dysarthria Assessment,¹⁴ Stuttering Severity Instrument,¹⁵ and Kannada Articulation Test¹⁶ were used to assess the individuals. Vineland Social Maturity Scale-Indian adaptation¹⁷ and Developmental Screening Test¹⁸ were used for the screening of mental disorders by the Clinical Psychologist. All the data available concerning the individual's medical history and that which was obtained through the test battery were then compiled to arrive at a probable diagnosis. Further, those who were diagnosed with communication disorders were provided with appropriate habilitation/rehabilitation services feasible at the camp. For the individuals who had ear and hearing related problems, free medicine and hearing aids were distributed based on the need. Parents of children with congenital hearing impairment received minimum of two counselling sessions about the use of hearing aid and need for therapy and were referred to AIISH for further management. Individuals with voice, fluency, articulation and language disorders also obtained minimum of two counselling sessions regarding the nature of the disorder and possible causes of the same. Home training materials were given and specific therapy techniques were demonstrated to the client/caregiver. Those who required long term training and individuals with language disorders were referred to AIISH.

The data collected from the camp was then analyzed using SPSS 20 software.¹⁹ Descriptive statistics was done for the tabulated data to investigate the trend in the data. The percentage of individuals who were at risk of communication disorders was calculated from the survey data gathered from the five islands. However, disorder specific prevalence estimation was done using camp data gathered from 3 islands.

3. Results

3.1. Prevalence of communication disorders

A total population of 22,558 individuals were surveyed for the presence of communication disorders in five islands of

Lakshadweep (Andrott, Amini, Agatti, Kiltan and Kadamat). The survey covered 63.12% of total population (35,741) as estimated by the government of India during 2011 Census. Among the total population covered by the survey, 819 (3.63%) individuals were identified to be at risk of having communication disorders. Among 819 individuals, 436 were males and 383 were females with male-female ratio 1.14:1. Further, 311 individuals were under the age of 15 years (paediatrics) and 508 individuals were greater than 15 years (adults). This age-wise classification was made based on the High Risk Register used for the survey. Among 819 individuals, 505 presented symptoms of ear related problems (hearing loss associated with ear pain, ear discharge, tinnitus, feeling of fullness, blocking sensation and itching sensation) and 314 individuals were found to have speech-language related problems (child and adult language disorders, fluency, articulation and voice disorders).

In the evaluation camps, a total of 339 individuals were evaluated to identify the presence of communication disorders. Among 339 individuals, 262 (77.29%) individuals were identified to be having at least one of the communication disorders. Among the identified population, 106 (42.64%) individuals had ear related problems and 156 (57.36%) individuals had speech and language disorders.

3.2. Audiological and otological cases

A total of 188 individuals reported to ENT specialists. Among 188 cases, 119 cases were referred for audiological evaluation by the ENT specialists (Andrott-66, Kiltan-24, Kavaratti-29). Out of these, 106 (212 ears) individuals were found to have hearing loss, 10 individuals had normal hearing sensitivity and the remaining 3 children were not co-operative during screening and hence were referred to mother institute (AIISH) for detailed evaluation. Out of 106 (212 ears), 13 (13 normal ears) individuals had unilateral hearing loss and 53.77% (114) comprised of males and 46.23% (98) comprised of females. The distribution of degree of hearing loss was analyzed considering the number of ears with different degrees of hearing loss. The

distribution of population into different degrees of hearing loss and the 95% confidence intervals are as shown in Table 1. When the degree of hearing loss was considered, moderately severe and profound degree of hearing loss were lesser compared to other degrees of hearing loss. From Table 1, it can be seen that the presence of hearing loss was higher in males than in females with a ratio of 1.16:1 and more number of adults had hearing loss compared to paediatric population.

Among 106 individuals, 40 (37.74%) had conductive hearing loss, 50 (47.17%) had sensorineural hearing loss and 11 (10.37%) individuals had mixed hearing loss either in one or two ears and 5 (4.72%) individuals had two different types of hearing loss in two ears. The proportion of unilateral and bilateral hearing losses across different types of hearing loss is as shown in Fig. 1. As it can be seen from the figure, the occurrence of bilateral hearing loss was more than that of unilateral hearing loss. In addition, when symmetry was considered individuals with symmetrical hearing loss comprised of 75.47% (80) of the total individuals and other 24.53% (26) of individuals had asymmetrical hearing loss. The common conditions that manifested as conductive hearing loss were Acute Otitis Media (2), Chronic Suppurative Otitis Media (28), Secretory Otitis Media (3), Eustachian Tube (ET) dysfunction (3) and Impacted Wax (15).

3.3. Speech and language disorders

The total number of individuals who visited evaluation camp with speech-language related complaints were 165. Among these individuals, a total of 136 (82.42%) were found to have disorders related to any of the five domains: they are, Language (75, 55.15%), Fluency (14, 10.29%), Voice (9, 6.62%), Articulation (23, 16.91%) or Multiple Disability (15, 11.03%). Other, 29 individuals were found to have adequate speech-language skills. The Child Language Disorders (CLDs) observed during the camp were Mental Retardation (MR), Cerebral Palsy (CP), Delayed Speech & Language (DSL), Inadequate Speech & Language (ISL), Delayed Speech & Language with Hearing Loss (DSL with HL), Learning Disability (LD), and Slow Learner (SL).

Table 1 – Proportion and 95% confidence interval for hearing related problems across degree of hearing loss, gender and age.

Degree (overall)	Male (ears)		Female (ears)	
	Paediatric	Adult	Paediatric	Adult
Minimal	4.02(8) ±3.65	7.54(15) ±4.81	8.04(16) ±4.93	0(0)
Mild	4.52(9) ±3.85	5.02(10) ±4.04	5.53(11) ±4.21	4.52(9) ±3.85
Moderate	2.01(4) ±2.64	8.54(17) ±5.06	6.03(12) ±4.37	3.02(6) ±3.2
Moderately severe	2.51(5) ±2.93	5.53(11) ±4.21	0.50(1) ±1.34	4.02(8) ±3.65
Severe	3.52(7) ±3.43	5.02(10) ±4.04	3.52(7) ±3.43	6.03(12) ±4.37
Profound	1.01(2) ±1.88	4.02(8) ±3.65	2.01(4) ±2.64	3.52(7) ±3.43

Notes: 1. Number of ears affected by each condition is given in the parentheses.
2. Confidence intervals have been displayed in Italics.

Fig. 1 – Distribution of population according to type and symmetry of hearing loss.

Language Disorders

Fig. 2 – Distribution of population across different language disorders.

The Adult Language Disorder observed was Aphasia. The proportions of these disorders were as shown in Fig. 2. Distribution of the above mentioned disorders across age groups and gender and the 95% confidence intervals were as shown in Table 2. As it can be seen from the table, paediatric population comprised three fourth of the population and the rest 25% were adults. The same trend regarding age was seen for all disorders considered under the broad classification of speech–language disorders. In addition, analysis was done considering gender as a variable and the results revealed a high occurrence of speech–language disorders in males (60.29%) compared to females (39.71%) with a male–female ratio 1.52:1. The same trend was observed for all the sub-classifications of speech–language disorders (Table 2).

The speech disorders observed during camp were Articulation/Phonological disorders [Misarticulation, Dysarthria, Cleft-lip & palate (CLP)], Fluency disorders (stuttering), and voice disorders (breathy and hoarse voice). The distribution of population was as shown in Fig. 3.

4. Discussion

In the present study, an overall 819 (3.63%) individuals were found to be at risk of having communication disorders among the 22,558 individuals surveyed in Lakshadweep islands. Among the 262 (out of 339) individuals who were identified at the camp, 42.64% were diagnosed with ear related disorders and 57.36% were diagnosed with speech–language disorders.^c

The prevalence of communication disorders estimated in the Lakshadweep islands was found to be higher than that reported in developed countries.^{3–6} The possible explanation for this finding could be the higher incidence of infectious

^c To avoid overlap between speech–language and hearing loss cases, individuals with speech–language disorder secondary to hearing loss were grouped under language disorders section, and they were excluded from audiological and ontological disorders section.

Table 2 – Proportion and 95% confidence interval for speech-language disorders across age and gender.

Disorders	Prevalence			
	Male		Female	
	Paediatric	Adult	Paediatric	Adult
Language	24.26(33) ±7.9	6.62(8) ±4.56	18.38(25) ±7.28	6.62(9) ±4.81
Fluency	5.15(7) ±4.29	2.20(3) ±2.87	2.20(3) ±2.87	0.74(1) ±1.67
Voice	4.41(6) ±3.99	0.74(1) ±1.67	1.47(2) ±2.35	0(0)
Articulation/phonological disorders	6.62(9) ±4.81	2.20(4) ±3.29	6.62(9) ±4.81	0.74(1) ±1.67
Multiple disorder	7.35(10) ±5.04	0.74(1) ±1.67	2.94(4) ±3.29	0(0)
Normal	13.23(18)	1.47(2)	3.68(5)	2.94(4)

Notes: 1. Number of individuals affected by each condition is given in the parentheses.
2. Confidence intervals have been displayed in Italics

disorders like otitis media, cytomegallo virus infection, meningitis, rubella and lesser accessibility to health care facilities due to lack of professionals, lack of awareness about the preventive measures, unregulated access to ototoxic medicines and greater consanguinity.^{20–23} Whereas, when compared to main land (India) the study showed lower prevalence.⁸ Konadath et al. (2013) conducted study in a rural region of India. The possible reason for this could be the higher literacy rate in Lakshadweep (91.85%) compared to Karnataka (75.36%) where the study was conducted.²⁴ However, the proportion of speech-language disorders was found to be higher (57.36%) than that reported by the same authors (9.42%). This finding may be due to high rate of consanguineous marriages found within the Lakshadweep community.²⁵ In support to this explanation, studies conducted by Costeff et al.²³ and Aremu et al.²⁶ have shown a higher prevalence of communication disorders in communities practicing consanguineous marriage. Consequently, since Lakshadweep is a secluded community and there is increased practice of consanguineous marriages within the community, this might have led to high proportion of speech-language disorders.

However, this explanation warrants further exploration as the present study did not aim to study the effect of consanguinity.

4.1. Audiological and otological disorders

The results revealed a slightly higher proportion of hearing loss in males compared to females (1.16:1). Similar findings were obtained by studies conducted by Lin²⁷; Beria et al.²⁸; Annie et al.²⁹ The possible reason for this finding could be more exposure of males to noise than that of females as the major occupation of the region is fishing and coir industries (fisheries department), where there is a high chance of exposure to noise by men. Study conducted by Zytoon³⁰ has shown the level of noise exposure (84.7–94.3) to exceed NIOSH criteria³¹ of 85 dB for fishermen working aboard small and medium fishing vessels. Further, high rate of ear related disorders was observed in adults compared to children. Studies conducted by Konadath et al.,⁸ Beria et al., 2007,²⁸ and NSSO survey are in par with the current results. Possible reason for this finding could be the increasing prevalence of hearing loss in adults due to age related factors^{8,27} and exposure to environmental factors like noise. In addition, bilateral hearing loss and moderately severe and profound degree of hearing losses were found to be more than unilateral and other degrees of hearing losses. Similar results have been found by different studies.^{8,27}

4.2. Speech-language disorders

The rate of speech-language disorders was found to be more in children and in males compared to adults and females. The probable reason for the higher rate of speech-language disorders in children could be the developmental aspects. Several studies have shown a decreasing prevalence of speech, language and communication difficulties as the age increases.^{5,6} Report from Barkoukis et al.⁶ revealed younger children to outgrow their communication difficulty with increasing age resulting in lesser prevalence of fluency, articulation disorders in older age group. When different speech-language disorders were considered, occurrence of child language disorders was higher compared to speech

Fig. 3 – Distribution of population across different speech disorders.

5. Conclusions

The present study aimed to examine the prevalence of communication disorders in Lakshadweep, India. Towards this aim, a door to door survey and evaluation camps were conducted in six islands of Lakshadweep. The percentage of individuals who were at-risk of communication disorders was found to be 3.63%. Compared to the mainland prevalence overall prevalence in Lakshadweep islands was lesser. The possible reasons for the findings may be the higher literacy rate resulting in higher awareness about precautionary measures. However, the proportion of speech-language disorders was found to be higher compared to the mainland, possibly due to increased practice of consanguinity. Since the present study did not aim at finding the causative factors for the existing prevalence, further studies are recommended in that direction. However, in comparison to developed countries the prevalence rate was found to be higher. Thus, the results of the present study throw light on the need for increased awareness regarding the communication disorders

Conflicts of interest

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Appendix A. Appendix I

NSS SPECIAL CAMP, 2012-2013 HELD AT LAKSHADWEEP ISLANDS
SURVEY OF COMMUNICATION DISORDERS IN (Name of the island).....

Sl. No.	Door No. & Head of the Family	No. of Members	SPEECH & LANGUAGE												EAR RELATED				ASSOCIATED CONDITION/ OTHER				COMMENTS/ SLAB
			LANGUAGE				FLUENCY				ARTICULATION				VOICE								
			M		F		M		F		M		F		M		F		M		F		
			P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	P	A	
TOTAL																							

REFERENCES

- Association AS.. *Definitions of Communication Disorders and Variations*. 1993.
- Garg S, Chadha S, Malhotra S, Agarwal A. *Deafness: Burden, Prevention and Control in India*. 2009.
- Silva PA, Williams S, McGee R. A longitudinal study of children with developmental language delay at age three: later intelligence, reading and behaviour problems. *Dev Med Child Neurol*. 1987;29(5):630–640.
- Shriberg LD, Tomblin JB, McSweeney JL. Prevalence of speech delay in 6-year-old children and comorbidity with language impairment. *J Speech Lang Hearing Res*. 1999;42(6):1461–1481.
- Dockrell J, Ricketts J, Lindsay G. *Understanding Speech, Language and Communication Needs: Profiles of Need and Provision* (2012). 2012.
- Barkoukis MAA, Staats RN, Dombeck M. Communication disorders: stuttering and prevalence/diagnosis of communication disorders-childhood mental disorders and illnesses. <http://www.pvmhmr.org/37-childhood-mental-disorders-and-illnesses/article/594-communication-disorders-stuttering-and-prevalence-diagnosis-of-communication-disorders> Accessed 28.05.15.
- Stevens G, Flaxman S, Brunskill E, Mascarenhas M, Mathers CD, Finucane M. Global and regional hearing impairment prevalence: an analysis of 42 studies in 29 countries. *Eur J Public Health*. 2013;23(1):146–152.
- Konadath S, Chatni S, Jayaram G, Maruthy S, Guptha M, Swamy PS. Prevalence of communication disorders in rural population of India. *J Hearing Sci*. 2013;3(2):41–49.
- censusindia.gov.in. Provisional population data sheet basic figures at a glance. http://censusindia.gov.in/2011-prov-results/data_files/lakshadweep/data%20sheet.pdf Accessed 28.05.15.
- Anitha T, Yathiraj A. *Modified High Risk Registers (HRR) for Professional and Non-Professional Formulation and Its Efficacy*. Independent Project submitted to Univ. of Mysore, as a part fulfillment of M.Sc. (Sp. & Hg.); 2001.
- American National Standards Institute. ANSI S3.39-1987 (R2002). *Specifications for Instruments to Measure Aural Acoustic Impedance and Admittance (Aural Acoustic Immittance)*. New York: American National Standards Institute; 2002.
- Clark JG. Uses and abuses of hearing loss classification. *ASHA*. 1981;23(7):493–500.
- Bzoch KR, League R. *Receptive-Expressive Emergent Language Scale*. Pro-ed; 1991.
- Enderby P, Pamela M. *Frenchay Dysarthria Assessment*. College Hill Press; 1983.
- Riley G. *Stuttering Severity Instrument for Children and Adults*. Pro-ed; 1994.
- Babu R, Ratna N, Bettagiri R. Test of articulation in Kannada. *JAIISH*. 1972;3:7–19.
- Bharatraj J. *Vineland Social Maturity Scale-Indian Adaptation: Enlarged Version*. Mysore: Swayamsiddha Prakashanam; 1992.
- Bharatraj J. *Developmental Screening Test*. Mysore: Swayamsiddha prakashanam; 1997.
- IBM Corp.. *IBM SPSS Statistics for Windows, Version 20.0*. Armonk, NY: IBM Corp.; 2011.
- Bhat R, Babu SK. Health insurance and third party administrators: issues and challenges. *Econ Polit Weekly*. 2004;3149–3159.
- Panchamukhi P. Social impact of economic reforms in India: a critical appraisal. *Econ Polit Weekly*. 2000;836–847.
- Dev SM, Mooij J. Social sector expenditures in the 1990s: analysis of central and state budgets. *Econ Polit Weekly*. 2002;853–866.
- Costeff H, Cohen BE, Weller L. Parental consanguinity among Israeli mental retardates. *Acta Paediatr*. 1972;61(4):452–458.
- census2011.co.in. Literacy rate of India-population census 2011. <http://www.census2011.co.in/literacy.php> Accessed 28.05.15.
- Roychoudhury A. Inbreeding in Lakshadweep. *Man India Ranchi*. 1977;57(4):326–330.
- Aremu SK, Afolabi OA, Alabi BS, Elemunkan IO. Epidemiological profile of speech and language disorder in north central Nigeria. *Int J Biomed Sci*. 2011;7(4):268.
- Lin FR, Niparko JK, Ferrucci L. Hearing loss prevalence in the United States. *Arch Intern Med*. 2011;171(20):1851–1853.
- Béria JU, Raymann BCW, Gigante LP, et al. Hearing impairment and socioeconomic factors: a population-based survey of an urban locality in southern Brazil. *Rev Panamer Salud Públ*. 2007;21(6):381–387.
- Jacob A, Rupa V, Job A, Joseph A. Hearing impairment and otitis media in a rural primary school in South India. *Int J Pediatric Otorhinolaryngol*. 1997;39(2):133–138.
- Zytoon MA. Occupational noise exposure of fishermen aboard small and medium-scale fishing vessels. *Int J Ind Ergonom*. 2013;43(6):487–494.
- National Institute for Occupational Safety and Health, Centers for Disease Control and Prevention. Criteria for a recommended standard: occupational noise exposure, revised criteria 1998. <http://www.cdc.gov/niosh/docs/98-126/> Accessed 28.05.15.
- Binu A, Sunil R, Baburaj S, Mohandas M. Sociodemographic profile of speech and language delay up to six years of age in Indian children. *Int J Med Res Health Sci*. 2014;3(1):98–103.