

PREVALENCE OF COMMUNICATION DISORDERS IN A RURAL POPULATION OF INDIA

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Abstract

Background: Information about the prevalence of communication disorders is essential for planning prevention and rehabilitation services. The aim of this study was to estimate the prevalence of communication disorders between gender and across age groups among a rural population of India. This work reports a study conducted as part of field work by staff and students of the All India Institute of Speech and Hearing (AIISH), Manasagangothri, Mysore, India.

Material and method: A door-to-door survey of 15,441 individuals from 15 villages, irrespective of their age and gender, was conducted as phase I of the study. The villages were selected on a random basis. A modified high-risk questionnaire was administered to identify individuals at risk of communication disorders. Those found at risk were referred for detailed audiological and/or speech and language evaluation in phase II of the study.

Results: The survey found that the prevalence of individuals at risk of communication disorders was 6.07%. Among those at risk, and who attended phase II of the study, the prevalence of audiological and/or otological disorder was found to be 90.58% and that of speech and language disorder was 9.42%. Among those at risk of speech and language disorder, 22.9% were found to be at risk of mental retardation.

Conclusions: Audiological and/or otological disorders were found to be more prevalent among communication disorders in the selected population. In general, males showed a higher prevalence of communication disorders compared to females. The prevalence of severe and moderately severe hearing loss was found to be higher than other degrees of hearing loss. Child language disorders and reading/writing difficulties were the most prevalent problems among speech and language disorders.

LA APARICIÓN DE TRASTORNOS DE COMUNICACIÓN ENTRE LA POBLACIÓN RURAL EN LA INDIA

Resumen

Introducción: La información sobre la aparición de trastornos de comunicación es indispensable para la planificación de actuaciones de prevención y de prestación de servicios de rehabilitación. El objetivo de este estudio ha sido el poder estimar la presencia de trastornos de comunicación en dependencia del sexo y en varios grupos de edad entre la población rural en la India. El presente documento es el informe de una investigación realizada como parte del trabajo de campo por el personal docente y los estudiantes del Instituto General Indio de Habla y Audición [All India Institute of Speech and Hearing - aiisha] Manasagangothri, Mysore, India.

Materiales y método: La I fase del estudio ha consistido en entrevistas directas realizadas con 14 441 personas de 15 poblados, sin importar la edad ni el sexo. Los habitantes de dichos poblados han sido elegidos de forma aleatoria. Para identificar a las personas con riesgo de la posibilidad de aparición de trastornos de comunicación, se ha aplicado un cuestionario modificado de alto riesgo. Las personas definidas como en peligro han sido dirigidas al examen audiológico detallado, y también a la valoración del habla y de la comunicación verbal en la segunda fase del estudio.

Resultados: La encuesta ha demostrado que las personas con riesgo de trastornos de comunicación constituían un 6.07%. Entre las personas en peligro que participaron en la II fase del estudio, la incidencia de trastornos audiológicos y otológicos era del orden de un 90.58%, y la incidencia de trastornos del habla y de la comunicación verbal alcanzaba el nivel de 9.42%. Entre las personas con trastornos del habla y de la comunicación verbal, un 22.9% tenía riesgo de la posibilidad del retraso mental.

Conclusiones: En la población examinada, los trastornos audiológicos y otológicos fueron los más frecuentes entre los trastornos de comunicación. Por lo general, los trastornos de comunicación eran más frecuentes en hombres que en mujeres. En cuanto a las pérdidas parciales del oído, dominaban estas de carácter grave y moderado- en comparación con otros tipos de pérdida parcial del oído. Los problemas más frecuentes entre los trastornos del habla y de la comunicación verbal han sido los trastornos lingüísticos y problemas a la hora de leer/escribir.

НАЛИЧИЕ КОММУНИКАЦИОННЫХ РАССТРОЙСТВ СРЕДИ СЕЛЬСКОГО НАСЕЛЕНИЯ ИНДИИ

Изложение

Введение: Информация на тему наличия коммуникационных расстройств – необходимая для планировки превентивных и реабилитационных действий. Цель этого исследовательского проекта – оценка наличия коммуникационных расстройств в разделении по полу и в разных возрастных группах среди сельского населения Индии. Настоящая работа – это рапорт исследования, проведенного в рамках полевых работ коллективом и студентами Всеиндийского института речи и слуха [All India Institute of Speech and Hearing – AIISH], Манасаганотри, Майсур, Инди.

Материал и метод: Непосредственное интервью, проведенное среди 15 441 человек из 15 деревень, несмотря на возраст и пол – это первая часть исследовательского проекта. Жители деревень были выбраны случайно. Для идентификации людей, подверженных возможности наличия коммуникационных расстройств была использована модифицированная анкета высокого риска. Люди, у которых предполагалась возможность наличия расстройств, были направлены на подробные аудиологические исследования, а также на оценку речи и языковой коммуникации на втором этапе исследовательского проекта.

Результаты: Зондирование показало, что люди, подверженные наличию коммуникационных нарушений составляли 6,07%. Среди людей, подверженных возможности расстройств, которые взяли участие во втором этапе исследования, наличие аудиологических и отологических нарушений составило 90,58%, а наличие нарушений речи и языковой коммуникации – 9,42%. Среди людей с расстройствами речи и языковой коммуникации 22,9% человек было подверженных возможности умственного расстройства.

Итоги: В исследованном населении среди коммуникационных расстройств чаще всего наблюдались аудиологические и отологические расстройства. В общем, коммуникационные расстройства чаще наблюдались среди мужчин чем среди женщин. Среди видов тугоухости, в сравнении с другими видами глухоты, преобладает значительная и умеренная тугоухость. Языковые расстройства и проблемы с чтением/писанием – это самые частые наблюдающиеся проблемы среди расстройств речи и языковой коммуникации.

WYSTĘPOWANIE ZABURZEŃ KOMUNIKACYJNYCH WŚRÓD WIEJSKIEJ POPULACJI W INDIACH

Streszczenie

Wprowadzenie: Informacja na temat występowania zaburzeń komunikacyjnych jest niezbędna w celu planowania działań prewencyjnych oraz świadczeń rehabilitacyjnych. Celem tego projektu badawczego było oszacowanie występowania zaburzeń komunikacyjnych w rozróżnieniu na płeć oraz w różnych grupach wiekowych w populacji wiejskiej w Indiach. Praca prezentuje badania wykonane jako część działalności zespołu i studentów All India Institute of Speech and Hearing (AIISH), Manasaganotri, Mysore, India.

Materiał i metoda: Bezpośredni wywiad przeprowadzony wśród 15 441 osób z 15 wiosek, bez względu na wiek i płeć, stanowił I fazę projektu badawczego. Mieszkańcy wiosek wybrani zostali losowo. Do identyfikacji osób zagrożonych możliwością wystąpienia zaburzeń komunikacyjnych zastosowano zmodyfikowany kwestionariusz wysokiego ryzyka. Osoby określone jako zagrożone zostały skierowane na szczegółowe badanie audiologiczne, a także ocenę mowy i komunikacji językowej, w fazie II projektu badawczego.

Wyniki: Sondaż wykazał, że osoby zagrożone zaburzeniami komunikacyjnymi stanowiły 6,07%. Wśród osób zagrożonych, które wzięły udział w II fazie badania, występowanie audiologicznych i otologicznych zaburzeń kształtowało się na poziomie 90,58%, a występowanie zaburzeń mowy i komunikacji językowej na poziomie 9,42%. Wśród osób z zaburzeniami mowy i komunikacji językowej 22,9% było zagrożonych możliwością opóźnienia umysłowego

Wniosek: W badanej populacji zaburzenia audiologiczne i otologiczne były najczęstszym z zaburzeń komunikacyjnych. Ogólnie, zaburzenia komunikacyjne występowały częściej u mężczyzn niż u kobiet. Wśród niedosłuchów przeważały te znaczne i umiarkowane – w porównaniu z innymi typami niedosłuchów. Zaburzenia językowe oraz problemy z czytaniem/pisaniem były najczęściej występującymi problemami wśród zaburzeń mowy i komunikacji językowej.

Background

Communication disorders are potentially disabling conditions which have widespread and lifelong implications due to their impact on social and emotional well-being, cognition, behavior [1–4], and academic achievement in the school years; they also affect vocational choices later in adulthood [5]. According to Mosby's medical dictionary [6], prevalence is defined as "the number of people with a disease or condition in a given population at a specific time, either a point in time or over a period of time". Knowledge about the prevalence of a disorder is essential since it throws light on the requirement for health services and also helps in evaluating a disease problem in that population. It also aids in comparing the number of individuals with a particular disease in different populations and in examining trends in disease occurrence or severity over time.

There is a wide variation in the reported prevalence rates of speech and language disorders. It has been suggested that there is more variability in the prevalence rates for speech disorders compared to language delay [7]. Earlier studies have reported a range of prevalences: 4.19% for communication disorders as a whole in 2,980 children with an age range of 1–11 years [8], 11.08% for speech and language disorders in 1,655 participants of age 5 years [9], 3.8% in 7,218 children of 6 years of age [10], 1.51% for speech disorders [11], and 8.4% for language delay in 1,027 participants of 11 years of age [12]. In addition, other authors have reported prevalences of 0.72% [13] and 0.33% [1] for stuttering, 1.06% for articulation disorders [1], 3.9% [13] and 0.12% [1] for voice disorders, and 7.4% for specific language impairment (SLI) [14]. The prevalence of dyslexia has been reported to be 6.3% [15]. It has been reported that after a stroke, 5.3% of individuals had neurogenic stuttering in Belgium [16]. The prevalence of otological disorders (excluding ear wax) is reported to be 21.5% and for hearing impairment 11.9% [17]. The National Sample Survey Organization (NSSO) [18] suggested in a 2002 report that in India 21 out of every 1000 children have bilateral severe to profound hearing loss. A total prevalence rate of 7.3% for hearing impairment was found in rural areas [19]. The total prevalence of mental retardation is reported to be 2.3% in Karnataka [20].

The wide range of reported prevalence rates could be due to differences in the definitions, classification systems, research designs, and methods of study adopted. It could also be due to the varied age ranges used, dialect variations, and whether the study was urban or rural. As apparent from the WHO World Health Report in 2003 (<http://www.who.int/whr/2003/en/>), the prevalence of communication disorders also varies from one country to another, which can be attributed to the socioeconomic status, population, etc. In an Indian context, there is a dearth of reports indicating prevalence of each type of communication disorder. Thus, it is important to estimate the prevalence of various communication disorders in India. This study was therefore taken up as part of a special camp conducted by the volunteers of National Service Scheme (NSS) unit of the All India Institute of Speech and Hearing (AIISH), Mysore, Karnataka, in the rural part of Mandya district, Karnataka.

Aim

The study aimed at estimating the prevalence of communication disorders between genders and across age groups.

Method

A camp was organized in Mandya district, Karnataka, by the NSS unit of AIISH, Mysore. According to the 2011 India census, Mandya district consists of 54 villages with a total population of 1,761,718 (887,307 males and 874,411 females). Among these 54 villages, 15 were selected on a random basis for the survey. A total population of 15,441 was surveyed. For the referred population, only data on age and gender was collected. To avoid the inclusion of migrants in the survey it was ensured that the surveyed individuals had been residents of the village for at least one year [21].

The survey was conducted by 50 NSS volunteers of AIISH, Mysore. These volunteers were pursuing their graduate (Speech and Hearing) or post-graduate (Audiology/Speech Language Pathology) studies at AIISH, which involved training in the evaluation and rehabilitation of persons with communication disorders. The volunteers carried out a door-to-door survey to identify individuals at risk of communication disorders. General information questionnaires (Appendix 1), developed for the purposes of the survey, were used to collect demographic data and number of persons at risk of communication disorders in each house in each of the 15 villages. The general information questionnaire was mainly aimed at obtaining information from each family about the number of family members, socioeconomic status, and any possible risk of speech, language, and hearing-related problems. Modified High Risk Registers (HRRs) for Professional and Non Professional Formulation and its Efficacy, developed in 2001 by Anitha and Yathiraj [22], was administered to collect information about the medical history of the individual at risk of a communication disorder, and its probable cause. Information about pre-, peri-, and post-natal history and family history, if available, was also documented for the entire population if applicable. Although no published data for specificity and sensitivity is available for the HRR used, all questions are structured so as to tap into all possible causes and symptoms of communication disorders. The prenatal factors screened in the HRR assessment were excessive vomiting, elderly pregnancy, high/low B.P., blood sugar, history of abortion, Rh incompatibility, viral/bacterial infections, chemical fumes exposure, maternal alcohol consumption, smoking, ototoxic medication, and intake of mycin group medication during pregnancy. Natal factors such as low birth weight, neonatal jaundice, delayed birth cry, premature delivery, birth asphyxia, fetal distress, aspiration of amniotic fluids, abnormal delivery, NICU, and APGAR score were assessed. Post-natal history such as presence of craniofacial/structural anomalies, congenital anomalies, degenerative diseases, viral/bacterial infections, convulsions, poor vegetative skills, history of ASOM/CSOM, head or neck trauma, CVA, functional/psychological problems, vocal misuse/abuse, and noise exposure were also documented. Positive family history for communication disorder, consanguinity, and type of delivery were also considered as high risk factors. All individuals

who were found to be at risk, irrespective of their chronological age, were referred for detailed evaluation.

The test battery used was adjusted for each individual. The decision of which tests were to be included in the test battery was taken by scrutinizing the data collected from the questionnaire. The evaluation was carried out by the student volunteers under the supervision of a qualified audiologist and speech-language pathologist. The test battery for the audiological assessment included otoscopic screening by a qualified ENT surgeon and pure-tone air-conduction thresholds (at 500, 1000, 2000, and 4000 Hz) and immittance evaluation by the volunteers. Due to time constraints, audiometric testing at high frequencies for the population could not be done. However, those with a relevant history of noise exposure or probable ototoxicity history were referred to AIISH for comprehensive evaluation. The audiometer used was a Proton dx5 (Type II) and a GSI-38 for immittance evaluation. The audiological evaluation was not conducted in a sound proof booth; however, it was ensured that the environmental noise levels were low in the camp location. Also, biological calibration of the instruments was done before the evaluation, to take into account any instrumental error and other environmental factors. Bone conduction thresholds were not obtained during the screening due to wide variation of calibration data. The degree of hearing loss was determined using the classification system given by Clark [23]. According to this classification system, if the pure-tone average (PTA) for octave frequencies 500, 1000, and 2000 Hz is between -10 and 15 dB, hearing sensitivity is considered to be within normal limits. Slight hearing loss refers to PTA of 16 to 25 dB; mild hearing loss has PTA between 26 to 40 dB, 41 to 55 dB refers to moderate hearing loss, 56 to 70 dB as moderately severe hearing loss, 71 to 90 dB as severe hearing loss, and PTA more than 90 dB refers to profound hearing loss. The assessment for speech and language disorders was carried out using standardized tests such as Receptive Expressive Emergent Language Scale [24], Frenchay Dysarthria Assessment [25], Stuttering Severity Instrument [26], and Kannada Articulation Test [27]. Screening of mental abilities was carried out by the clinical psychologist using Vineland Social Maturity Scale (Indian adaptation) [28] and Developmental Screening Test [29]. The medical history was considered, wherever available and applicable, to make an appropriate diagnosis. The results from the test battery were then documented, and this information was used for diagnosis and classification of communication disorders. Those found to have a communication disorder were given appropriate counseling and rehabilitation. A commercially available Statistical Package for Social Science software (version 16.0) [30] was used to find the prevalence of communication disorders. Descriptive and inferential statistics was administered for analysis of the data. The estimation analysis was carried out to extrapolate the prevalence of the various communication disorders from the available data, as all the individuals at risk did not take part in the detailed evaluations done after the survey.

Results

Prevalence of communication disorders

Among the 15,441 individuals surveyed, 938 individuals (6.07%) were found to be at risk of communication

Table 1. Distribution of communication disorders among the reported individuals

Disorder	Prevalence
Audiological and otological	90.58%
Speech and language	9.42%

Table 2. Confidence interval of estimated prevalence of communication disorders

Disorder	Lower bound	Upper bound
Audiological and otological	88.02	93.13
Speech and language	-0.22	19.06

Table 3. The distribution of population with different degrees of hearing loss

Hearing sensitivity	Number of ears	Prevalence (%)
Slight hearing loss	42	8.4
Mild hearing loss	76	15.2
Moderate hearing loss	120	24.0
Moderately severe hearing loss	97	19.4
Severe hearing loss	128	25.6
Profound hearing loss	37	7.4

Table 4. Confidence interval of the distribution of population with different degrees of hearing loss

Hearing sensitivity	Lower bound	Upper bound
Slight hearing loss	0.10	16.69
Mild hearing loss	7.29	23.11
Moderate hearing loss	16.61	31.39
Moderately severe hearing loss	11.74	27.06
Severe hearing loss	18.30	32.90
Profound hearing loss	-0.95	15.75

disorders. Those found at risk were then referred for a detailed evaluation. However, from the total referrals, only 529 individuals (56.40%) reported for the detailed evaluation, of which 312 individuals were male and 217 were female. Among the reported population, 12 were under the age of 3 years, 129 individuals were 3–15 years of age, 175 were 15–50 years old, and 213 were aged more than 50 years. All were evaluated for the presence of ear-related problems and speech-language disorders. Among those evaluated, 168 individuals (31.76%) were found to have clinically normal communication skills and 361 (68.24%) were found to have communication disorders. Amid the

Table 5. Prevalence of hearing loss across different age groups

Hearing sensitivity (degree of HL)	Prevalence in% (number of individuals)							
	<3 years		3–15 years		15–50 years		>50 years	
	M	F	M	F	M	F	M	F
Slight	0.0 (0)	0.0 (0)	0.8 (4)	0.8 (4)	0.4 (2)	1.4 (7)	3.0 (15)	2.0 (10)
Mild	0.0 (0)	0.0 (0)	0.6 (3)	0.0 (0)	3.6 (18)	4.2 (21)	3.8 (19)	3.0 (15)
Moderate	0.0 (0)	0.0 (0)	1.4 (7)	0.6 (3)	4.6 (23)	4.4 (22)	9.4 (47)	3.6 (18)
Moderately Severe	0.0 (0)	0.0 (0)	0.2 (1)	0.0 (0)	2.8 (14)	1.8 (9)	10.6 (53)	4.0 (20)
Severe	0.0 (0)	0.0 (0)	0.8 (4)	0.8 (4)	3.8 (19)	1.6 (8)	12.4 (62)	6.2 (31)
Profound	0.0 (0)	0.0 (0)	0.4 (2)	0.4 (2)	0.4 (2)	0.4 (2)	3.2 (16)	2.6 (13)
Total	0.0 (0)	0.0 (0)	4.2 (21)	2.6 (13)	15.6 (78)	13.8 (69)	42.4 (212)	21.4 (107)

M – male; F – female.

Table 6. Confidence interval of the prevalence of hearing loss across different age groups

Degree of HL		Prevalence in%							
		<3 years		3–15 years		15–50 years		>50 years	
		M	F	M	F	M	F	M	F
Slight	LB	0.00	0.00	-7.92	-7.92	-8.34	-7.29	-5.60	-6.65
	UB	0.00	0.00	9.52	9.52	9.14	10.09	11.60	10.65
Mild	LB	0.00	0.00	-8.13	0.00	-4.96	-4.33	-4.75	-5.60
	UB	0.00	0.00	9.33	0.00	12.16	12.73	12.35	11.60
Moderate	LB	0.00	0.00	-7.29	-8.13	-3.91	-4.12	1.16	-4.96
	UB	0.00	0.00	10.09	9.33	13.11	12.92	17.64	12.16
Moderately severe	LB	0.00	0.00	-8.55	0.00	-5.81	-6.87	2.43	-4.54
	UB	0.00	0.00	8.95	0.00	11.41	10.47	18.77	12.54
Severe	LB	0.00	0.00	-7.92	-7.92	-4.75	-7.08	4.33	-2.22
	UB	0.00	0.00	9.52	9.52	12.35	10.28	20.47	14.62
Profound	LB	0.00	0.00	-8.34	-8.34	-8.34	-8.34	-5.39	-6.02
	UB	0.00	0.00	9.14	9.14	9.14	9.14	11.79	11.22
Total	LB	0.00	0.00	-4.33	-6.02	7.72	5.81	36.13	13.85
	UB	0.00	0.00	12.73	11.22	23.48	21.79	48.67	28.95

LB – lower bound; UB – upper bound; M – male; F – female.

reported population who were affected, 327 (90.58%) had ear-related problems and 34 (9.42%) had speech and language disorders. Table 1 shows the distribution of communication disorders. The estimation analysis was carried out and 95% confidence intervals are given in Table 2.

Prevalence of audiological and otological disorders

The audiological and otological disorders considered in the present study were hearing loss, ear discharge, ear pain, and tinnitus. A total of 654 ears had complaints of otological

and audiological disorders. The results indicated a prevalence of 76.45% (500 ears) for hearing loss which comprised 311 ears of males and 189 of females. It was observed that the prevalence of severe hearing loss and moderately severe hearing loss was higher compared to slight and profound hearing loss. The distribution of the population with different degrees of hearing loss is given in Table 3 and the 95% confidence intervals are given in Table 4.

Children below 3 years were behaviorally screened for hearing loss using calibrated noise makers. Although none

Table 7. Prevalence of speech and language disorder across age and gender

Speech and language disorder	Prevalence in% (number of individuals)							
	<3 years		3–15 years		15–50 years		>50 years	
	M	F	M	F	M	F	M	F
Child language disorder	2.9 (1)	0.0 (0)	11.8 (4)	2.9 (1)	5.9 (2)	5.9 (2)	0.0 (0)	0.0 (0)
Voice disorder	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	2.9 (1)	2.9 (1)	0.0 (0)	0.0 (0)
Phonological disorder	0.0 (0)	0.0 (0)	5.9 (2)	5.9 (2)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Fluency disorder	0.0 (0)	0.0 (0)	8.9 (3)	0.0 (0)	5.9 (2)	0.0 (0)	0.0 (0)	0.0 (0)
Neurological stuttering	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	2.9 (1)	0.0 (0)
Reading/writing difficulty	0.0 (0)	0.0 (0)	17.7 (6)	5.9 (2)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Dysarthria	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	2.9 (1)	0.0 (0)	5.9 (2)	0.0 (0)
Multiple disability	0.0 (0)	0.0 (0)	2.9 (1)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)	0.0 (0)
Total	2.9 (1)	0.0 (0)	47.2(16)	14.7 (5)	17.6 (6)	8.8 (3)	8.8 (3)	0.0 (0)

M – male; F – female.

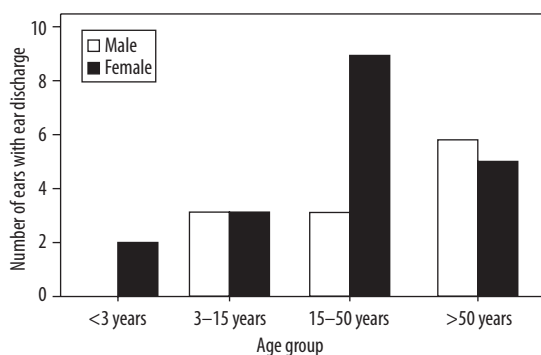


Figure 1. Occurrence of ear discharge across different age groups and by gender

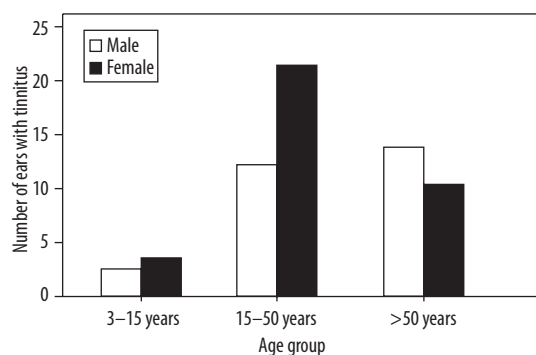


Figure 3. Occurrence of tinnitus across different age groups and by gender

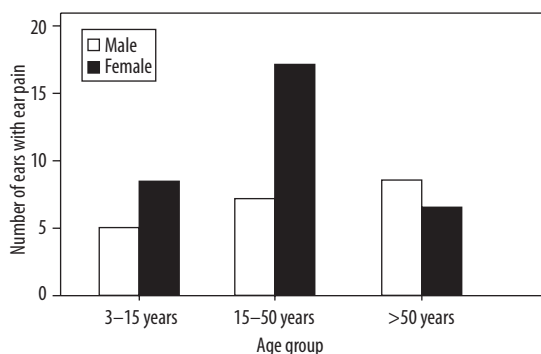


Figure 2. Occurrence of ear pain across different age groups and by gender

of the children in the age group of 0–3 years were identified to have hearing loss, all of them were referred to AIISH for a comprehensive audiological evaluation. Of

individuals between 3–15 years of age, 34 ears had hearing loss, and of those between 15–50 years of age, 147 ears had hearing loss. The number of ears of individuals aged more than 50 years with hearing loss was 319. Individuals belonging to age group of 50 years or more had a higher prevalence of hearing loss compared to other age groups. Further, males had a higher prevalence of hearing loss compared to females. Table 5 shows the prevalence of hearing loss in various age groups and genders and the 95% confidence intervals are given in Table 6.

In addition, when the data was analyzed by individuals and not ears, it was seen that 3.11% of the individuals with audiological problems had unilateral hearing loss and 31.13% had asymmetrical hearing loss. The remaining 65.76% had symmetrical hearing loss.

Apart from hearing loss, otological complaints such as ear discharge, ear pain, and tinnitus (intermittent and continuous) were also reported. Ear discharge, ear pain, and tinnitus were more prevalent in females in the age range of

Table 8. Confidence intervals for the estimated prevalence of speech and language disorder across age and gender

Disorder		Prevalence in%							
		<3 years		3–15 years		15–50 years		>50 years	
		M	F	M	F	M	F	M	F
CLD	LB	-29.97	0.00	-19.75	-29.97	-26.72	-26.72	0.00	0.00
	UB	35.77	0.00	43.35	35.77	38.52	38.52	0.00	0.00
VD	LB	0.00	0.00	0.00	0.00	0.00	-29.97	0.00	-29.97
	UB	0.00	0.00	0.00	0.00	0.00	35.77	0.00	35.77
PD	LB	0.00	0.00	-26.72	-26.72	0.00	0.00	0.00	0.00
	UB	0.00	0.00	38.52	38.52	0.00	0.00	0.00	0.00
FD	LB	0.00	0.00	-23.27	0.00	-26.72	0.00	0.00	0.00
	UB	0.00	0.00	41.07	0.00	38.52	0.00	0.00	0.00
NS	LB	0.00	0.00	0.00	0.00	0.00	0.00	-29.97	0.00
	UB	0.00	0.00	0.00	0.00	0.00	0.00	35.77	0.00
RWD	LB	0.00	0.00	-12.74	-26.72	0.00	0.00	0.00	0.00
	UB	0.00	0.00	48.14	38.52	0.00	0.00	0.00	0.00
Dysarthria	LB	0.00	0.00	0.00	0.00	-29.97	0.00	-26.72	0.00
	UB	0.00	0.00	0.00	0.00	35.77	0.00	38.52	0.00
MD	LB	0.00	0.00	-29.97	0.00	0.00	0.00	0.00	0.00
	UB	0.00	0.00	35.77	0.00	0.00	0.00	0.00	0.00
Total	LB	-29.97	0.00	22.95	-16.26	-12.74	-23.27	-23.27	-29.97
	UB	35.77	0.00	71.45	45.66	48.14	41.07	41.07	35.77

UB – upper bound; LB – lower bound; M – male; F – female; CLD – childhood language disorder; VD – voice disorder; PD – phonological disorder; FD – fluency disorder; NS – neurogenic stuttering; RWD – reading/writing difficulty; MD – multiple disability.

15–50 years. Further, 4.7%, 7.8%, and 9.6% of the population with communication disorders had ear discharge, ear pain, and tinnitus, respectively. Figures 1–3 shows prevalence of ear discharge, ear pain, and tinnitus, respectively. For individuals less than 3 years, presence of ear pain and tinnitus could not be established.

Prevalence of speech and language disorders

Among the various speech and language disorders, the surveyed population reported child language disorders, voice disorders, phonological disorders, fluency disorders, reading/writing difficulty, motor speech disorders, and multiple disabilities. The results showed that the prevalence of speech and language disorders among those at risk (48 participants) was 70.80% (34 individuals). Child language disorders were the most prevalent and neurogenic stuttering and multiple disabilities were least prevalent. Further, prevalence was higher in males compared to females. Also, prevalence of speech and language disorders was higher in the age range of 3–15 years and lowest in senior citizens compared to other age groups. Table 7 shows the prevalence of these disorders and the 95% confidence intervals are given in Table 8.

Based on the results of screening tests used, 22.9% [11 individuals (7 males, 4 females)] of the population who were at the risk of speech and language disorders were at risk of mild to severe degree of mental retardation. These individuals were further referred to the mother institute for detailed evaluation.

Discussion

The results of the study showed that among the 15,441 individuals surveyed in the Mandya district, 6.07% were at risk of communication disorders. Within the population reported on, 90.58% had audiological and otological disorders and 9.42% had speech and language disorders.

The prevalence of speech and language disorders is in consonance with previous studies [9,10,14]. However, the prevalence of audiological and otological disorders is much higher than reported by others [17,19]. This could be due to a higher incidence of communicable and non-communicable diseases [31] and low gross domestic product (GDP) expenditure on health and education [32,33].

The study also showed that moderate, moderately severe, and severe hearing losses were more prevalent compared to slight, mild, and profound hearing losses. Such a comparison had not been reported in previous studies. Males had a higher prevalence of hearing loss compared to their female counterparts. This observation is on a par with the results obtained by various researchers around the globe [17,34]. Geriatric individuals also reported higher prevalence of hearing loss than in the other age groups, which is in agreement with the findings of Beria et al. (2007) [34]. This could be the result of higher risk of hearing loss among geriatric individuals due to presbycusis. Otological disorders such as ear discharge, ear pain, and tinnitus were reported to be most prevalent in females in the age group of 15 to 50 years compared to males and other age groups.

Child language disorders were found to be more prevalent compared to speech and adult language disorders. These findings are in accordance with past studies [10,11]. Overall, neurogenic stuttering and multiple disabilities were the least prevalent. Males showed higher prevalence of speech and language disorders compared to females, in agreement with the findings of Tomblin et al. (1997) [14]. Also the prevalence of the speech and language disorders was higher in the age group of 3–15 years. This is in accordance with the findings of Craig et al. (2002) [12]. Some 22.9% of the population who were at risk of speech and language disorders was also found to be at risk of mental retardation.

Conclusions

The results of the study showed that audiological and otological disorders were the most prevalent communication disorders. The population predominantly complained of hearing loss, which was more prevalent in the geriatric population. Among the speech and language disorders, child language disorders and reading/writing difficulties were the most prevalent complaints.

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This information could be used to develop a database which could include information from different regions across the country. This would help in better understanding the prevalence of communication disorders across different regions. The results of the present study could be used to plan and execute policies for the identification, management, and rehabilitation of individuals with communication disorders.

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