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Special Issue on:
**Speech, Language and Hearing
Disorders in Children**

Guest Editor

Dr. Aravind Kumar R.
Department of Speech Pathology & Audiology
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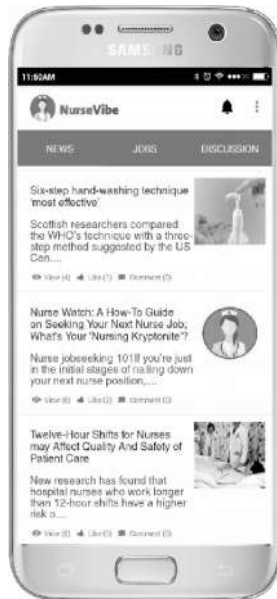


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Message from Guest Editor

I would like to extend my appreciation to the Red flower publication and the office of 'International Journal of Pediatric Nursing' for having come up with this special issue. I would like to thank the Speech language pathologists & Audiologists, and Psychiatry social workers who have contributed to this special issue, in their capacity of researchers and clinicians.

Human beings are the most successful mammalian species, for at least for the time period we know. The success lays not in our physical strength, as we are much inferior to many contemporary beings, but in our cognitive ability. What good could have happened, if we had isolated individuals who were intelligent? May be we would have kept inventing wheel for a million times. Lucky are we that our effective communication abilities worked to our advantage, for sparks of intelligence were spread by the wind of communication to light the human world. In the current world we live in i.e., 'the era of information', communication has occupied even more central status in our lives.

Man being a social being is in compulsion to communicate. Communication disorder pushes him and others around him to a helpless situation, in which they wouldn't be able to understand one another. Important is that, the age is not a factor for its effects on individuals. However, the impact is disastrous if it occurs at a young age i.e., developmental age. Various causes like anatomical defects, hearing loss, intellectual disorder, etc., can lead to communication disorders.

Parents/caretakers of children with communication disorder may approach varied health care professionals or the communication disorders could be detected by health professionals in varied settings, due its wide spectrum of causes & presentations. Hence, every health care professional should be well informed about communication disorders. Further, they should be able to provide appropriate recommendations/referrals as and when it warrants. Nursing professionals play a crucial role in any health care system, many a times they are the first and the last point of contact in it. It is thus more important to educate them about the crucial aspects of communication disorders.

Incidence & prevalence of communication disorders in children are high and, the challenges in early identification & effective intervention is huge, especially in a developing country like India. This special issue is aimed to equip the health care professionals with the crucial knowledge about communication disorders, so as to, deal with it effectively, ultimately bringing positive changes in the lives of children with communication disorders and their families.

Dr. Aravind Kumar R.

Department of Speech Pathology & Audiology
NIMHANS (INI), Bangalore, India

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Development of Auditory Skills, Speech and Language in Typically Developing Children in the Age Range 0-5 Years

B.K. Yamini*, Narinder Kaur**, Nitin K. Damam***

Author Affiliation

*Assistant Professor,
Department of Speech
Pathology & Audiology,
National Institute of Mental
Health & Neurosciences
(Institute of National
Importance) Bangalore,
Karnataka. ** Department of
ENT, Post Graduate Institute,
Chandigarh. ***Dr. S.R.
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B.K. Yamini, Assistant
Professor, Department of
Speech Pathology & Audiology,
National Institute of Mental
Health & Neurosciences
(Institute of National
Importance) Bangalore -
560029 Karnataka.
E-mail: yaminikh@gmail.com

Abstract

Language is a set of symbols, which is used for communication. It is a means to express ideas and communicate wants and needs. Language is partly innate and partly learnt. Speech is one of the means to express language, the others being gestures, pictures etc. Auditory skills are an essential prerequisite to develop language (verbal) and speech.

This article briefly brings forth the normal developmental stages of auditory skills, language and speech sounds in typically developing children from birth upto five years of age. In auditory skills, there is a change from developing just orienting responses (to environmental sounds) to a sustained attention to speech. In the receptive language domain, there is an increase from comprehending simple commands to complex ones. There is an increase in comprehension in the of variety of question forms and discourse comprehension. In the expressive-verbal language domain, there is an increase from first word to phrase production to sentence level utterances. Subsequently, lengthy descriptions and narration are produced. In speech sound production, vocalisations and vowels predominate the beginning and gradually all the phonemes in the particular language are acquired.

Keywords: Auditory Skills; Speech Development; Language Development.

Introduction

Verbal language is often (predominant) the mode of communication in humans with peripheral hearing and auditory receptive skills being its essential prerequisites. The development in humans, of receptive and verbal language can be observed in each of the domains of language i.e. phonology, morphology, syntax, semantics and pragmatics throughout the childhood. For the complexity of these developmental processes to progress in a coordinated manner with other cognitive skills, intact central nervous system is essential. The other significant factors that influence language development are critical period, cognitive skills, intact and functional auditory system, oral-vocal musculature and the

environmental stimulation.

Given that the in human beings hearing begins in the foetal period, i.e. around four months before birth, the sensitivity at birth to auditory stimulation is quite high which in turn tunes them to acquire verbal language. In the developmental period, the child may be exposed to one or more languages and consequently acquisition of predominant one or all of these languages can occur. Each of these languages which the child acquires are seen to follow through similar developmental stages. There could be a mixture of these languages in the production in a few situations. And language being the primary medium of knowledge acquisition and also social interaction, a delay in acquisition of language can impact both social aspects and academic aspects.

The following are the stages of normal development of auditory skills, language and speech in children.

Pre-Natal Period

Cochlea in human beings is fully developed by 20 months of gestation [2]. Responses to the auditory stimuli can be observed as early as 26 to 28 weeks of gestation [1, 8]. Though limited phonetic information is available to the fetus, however, the intonation patterns are well transmitted for the fetal perception [8]. Studies have reported fetal heart changes and movements for sounds [5, 8]. Hence, hearing constructs the basal pre-requisite to acquire language even before birth.

First Three Months

Auditory Skills

At birth child responds to the environmental sounds by eye blink, eye widening or startle response to loud sounds. Further child exhibits preference to mother's voice. By three months, the infant starts attending to speech by paying attention to the intonation pattern [7].

Language and Speech Skills

The non-reflexive, pleasurable, vocalisation of phonation and cooing stages are emergent. In the "phonation" stage (0-1 month) infants are found to be vocalising with adequate phonatory control but with limited resonance i.e. produced with a closed or a nearly closed mouth. In the cooing stage or the "goo" stage, the back of the tongue sounds like [u] are produced [6]. Subsequently, child produces single syllables.

Four-Six Months

Auditory Skill

Initially child moves eyes in the direction of sounds followed by rudimentary head turn and in the horizontal direction.

Language and Speech Skills

At the receptive level, by four months of age, the baby is capable of following the suprasegmental aspects to detect the different moods of a speaker. By five months of age, children begin to respond to their own names and later can recognize the commonly

used names of family members [7].

At the expression level, the child develops vocalisation for pleasure as well to show displeasure. It ceases to vocalise when adult enters the room. There is an exploration of the vocal mechanism through self-initiated vocal play by squealing, growling, yelling and making raspberry vocalisations and is referred to as the "expansion" stage. Adult -like vowels begin to appear [6]. Canonical babbling also appears by six months wherein there is repeated sequences of syllables [bababa], [mamama] etc.

Seven-Nine Months

Auditory Skills

By eight months, attention to auditory based activities improves [7]. The child would now be able to locate the sounds to the sides, however not above and below correctly. The child would respond to songs by making to and fro body movements or clapping and would enjoy playing peek-a-boo.

Language and Speech Skills

Understanding of speech (receptive language) advances and the child becomes sensitive to regularities in word-boundaries. The canonical babbling of repeated sequences of syllables, in expression, continues (upto 8 months). It is this stage that parents often mistake for "talking" although there is no meaning attached to the syllable sequences. Canonical babbling depends on auditory exposure, in addition to the physiological maturation. There is a usage of wide variety of sound combinations, including those not in the repertoire of the child's native language. Variegated babbling emerges at this stage [6].

Ten-Twelve Months

Auditory Skills

By the end of twelve months the child would be able to locate sounds in all the planes. Auditory attention to speech continues to expand to understand speech.

Language and Speech Skills

The child can understand a few simple requests and uses pointing, gestures and vocalisations as responses. The production of variegated babbling

continues in this period. It has adult-like syllables wherein within an utterance, there is more than one type of syllable such as [hatahata], [tekatehaka] etc.

The following stages i.e. from one year upto five years have the details of development of language and speech skills put forth by Gard, Gilman and Gorman (1993) [3].

1 - 1 ½ Years

The understanding continues to be built up. The child acquires its first word. Subsequently a vocabulary of upto 20 words is acquired of which 50 percent are nouns. Yet the child relies mostly on pointing, gestures and vocalization for communication or expressing wants and needs. Negation starts to emerge and a reply to question of "what is this" can be observed. They also start using sentence like intonation that mainly consists of jargon.

1 ½ - 2 Years

The child's receptive vocabulary is around 300 words. At the sentence level, he/she can understand commands and a few simple questions too. The expressive vocabulary has grown to about 50 words. The child starts putting words together to form sentences or two word phrases. The child speaks his/her own name; begin to uses pronouns like 'I, me and u', although he's confused in 'I and me'. He names familiar objects, uses verbs, a few adjectives and asks questions. At this time about 65% of speech is understandable (to others) or intelligible and most of the jargon is gone.

2-2 ½ Years

The child's listening abilities with respect to memory constantly improves and in a rapid fashion. The child can understand around 500 words and speaks around 200 words. The child knows all chief body parts at this age and will point to them when asked to, even name them and answer questions such as "what do hear/see with". In general, the child can answer 'where', 'what ...doing' questions. The grammatical morphemes at end of words found are present progressive, plurals and irregular past tense. Auxiliary -and, they are achieved. Speech intelligibility is increased to 70%.

2 ½ -3 Years

Child can understand approximately 900 words. Understanding of more variety of questions with

"who, why, where and how many" emerges, at a rudimentary level. In expression, vocabulary is increased to 500 words. Verbs begin to dominate. The speech would also include adjectives - big/little; prepositions- in, on, under; and auxillary -is, am,-ing; third person pronoun morpheme- 's', and possessives -mine. The usage of gestures are reduced and are replaced by -'that or it', when referring to an object. Child is able to state his own gender and age.

The child starts using more variety of questions. The utterance length is now increased to 3-4 words. The child is able to recollect events with reference to person and place. 80% of the child's speech is intelligible. The speech sounds mastered include p,m, n, w and h.

3-3 ½ Years

Child comprehends about 1200 words and understands 'how' questions. Child uses 'what' and 'who' questions. Appropriate usage of plurals i.e. 'is' and 'are' is observed. Complex sentences are formed. The child has a mean length of utterance of 3-4 words. Narrative skills emerge.

3 ½ -4 Years

Child comprehends about 2000 words, responds to 3-step commands involving actions, understands 'how-much' and 'what if' questions and can remember sequence of events. Child's vocabulary increases to 1800 words; uses locatives of 'up, down' in the sentences; starts asking 'how, why and when' questions; uses comparative words like -bigger; uses more conjunction words like, because,so,and if. The child forms frequent complex sentences, can tell a story but with little distinction between fact and imagination. Requesting permission is also noted and the child corrects others. The utterance length at this age is about 4.4 words. By this age the speech sounds mastered include b,d,k,g,f and y.

4- 4 ½ Years

By this age child acquires colour concept; understands 'before, after' used in narrating sequence of events; understands opposites like above, below, top and bottom to tell location of the objects; and fairly understands 'how far' questions. Concept of 'number' is much better at this age.

Child starts talking about past and future events. Child correctly uses irregular plural, past tense and third person pronoun. Child now speaks not only active sentences but passive sentences also appear. Conjunctions like 'if' and 'so' appear in the sentences.

Child starts using “what do... does... did...” questions. The mean length of utterance at this age is around 4.6 words. Child at this stage understands situation and maintains his vocal volume according to it. Child starts making request in more indirect ways. Turn taking in conversation is improved. Child begins to use language to tease and tell jokes. Connected speech is intelligible.

4 ½ – 5 Years

The child’s understanding continues to increase wherein executing three commands in sequence is feasible, comprehends a variety of adjectives, comprehends questions involving “how long” and “how often” issues. The expressive vocabulary is also constantly increasing and has reached 2500 – 2800 words. The child can say the days of the week in correct order, is also able to use possessive pronouns such as “his” and “hers” along with reflexive pronouns. Most of the speech sounds are now mastered.

The child’s language, thus, continues to grow. Its growth can be observed in both the first and the other languages the child is exposed to. If there is a discontinuation in the exposure and usage of any one of the languages, then the child may or may not retain the acquired linguistic skills of that language, in due course. In speech sound production, by six to seven years, sounds such as - ing, r,l,sh,ch,j are mastered and by eight years, voiced th, v,s,zh sounds are mastered.

Conclusion

At birth, the child’s sensory systems and neural network are ready to receive inputs, depending on the environment and with the intact oral-vocal structures; they begin the production of vocalisations. There is a consistent increase in sensitivity to sounds; be it environmental or speech sounds. Comprehension continues to grow and this precedes

the expression, on the various domains of language. There is a consistent expansion in verbal production.

Beyond five years too, the language skills continue to improve wherein the comprehension of complex series of utterances is feasible; judgments are made; appreciation of humour and telling lies develop and metalinguistic skills get refined. In speech sounds production too, the child acquires all the speech sounds of the language (s) he is exposed to.

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An Insight into the Causes of Hearing Loss in Neonates and Children

Pradeep Yuvaraj*, Hari Prakash**, Vijay Valli***

Author Affiliation

*Department of Speech Pathology & Audiology National Institute of Mental Health & Neurosciences (Institute of National Importance) Bangalore, Karnataka. **Dept of Speech and Hearing, School of Allied Health Sciences, Manipal University Manipal, Karnataka. ***Consultant, Karur Speech and Hearing Clinic, Karur, Tamil Nadu.

Reprint Request Pradeep Yuvaraj,

Department of Speech Pathology & Audiology National Institute of Mental Health & Neurosciences (Institute of National Importance)
Bangalore - 560029 Karnataka.
E-mail: pradaud@gmail.com

Abstract

World health organization estimates around 32 million children suffer from hearing loss. Hearing loss significantly affects the speech and language development of children. Onset of causes for hearing loss can occur as early as at embryonic development. Understanding hearing loss and their causes facilitates early intervention. The article provides an intuition into the reversible and irreversible causes for hearing loss at different stages through childhood.

Keywords: Conductive Hearing Loss; Sensori-Neural Hearing Loss; Syndromic; Non-Syndromic; Otitis Media; Pre-Natal; Peri-Natal; Post-Natal.

Introduction

Hearing loss is a partial or total inability to hear sounds. Hearing loss profoundly affects development, comprehension, production and maintenance of language, specifically speech. The effects are proportional to the degree and the type of hearing loss. Degree of hearing loss varies from minimal to profound. Depending on the cause and site of lesion, hearing loss can be of conductive (outer and/or middle ear), sensorineural (inner ear/auditory nerve), and mixed (outer/ middle and inner ear) type. An estimated 32 million children suffer from hearing loss in the world. The prevalence of disabling hearing loss in children is greatest in South Asia, Asia Pacific and Sub-Saharan Africa [21]. As the incidence and prevalence of hearing loss is high in pediatric population, it is essential for the health professionals to be aware of its causes. This article would provide a fair insight into the causes of hearing loss in neonates and children.

Causes Based on the Anatomical Ear Structure Involved

Outer Ear

Approximately 5% of the hearing impaired population has some sort of ear malformation. Congenital anomalies are the product of errors in embryogenesis (malformations) or the result of intrauterine events that affect embryonic and fetal growth (deformations and disruptions). The formation of the ear involves fusion of ectoderm, endoderm, and mesoderm. Defects in formation may lead to a wide variety of dysfunctional or malformed structures. Some of the abnormalities are microtia (abnormally small pinna), anotia (completely absence of auricles), atresia (absence of an external auditory meatus) and aural stenosis (abnormal narrowing of canal opening) [2].

Middle Ear

The external auditory canal, middle ear, and bulk

of the ossicular chain develop from the first branchial groove, first and second branchial arches, and first pharyngeal pouch. Embryologic development of these structures is complex. Rarely there are two anomalies identical. Common structural deformities of the middle ear are gross malformation or absence of middle ear cavity and antrum, ossicles may be abnormally formed (malleus and incus are often conglomerated into a unit), absent middle ear bones, and/or not attached to abnormally formed middle ear cavity either directly or via bony ridges. Tympanic membrane may be rudimentary or absent [2].

Inner Ear

Development of the inner ear structures occurs independently of external ear structures, and concomitant involvement is unusual. Some of the common inner ear deformities are Michel's aplasia (total absence of inner ear structures; occurs even with a normal conductive mechanism), Mondini's dysplasia (incomplete anomalies and developmental failure of bony and membranous ducts of inner ear), Scheibe's aplasia (dysplasia of membranous ducts of cochlea and saccule), Alexander's aplasia (congenital abnormalities of cochlear duct, especially affecting basal turn of cochlea) etc. [15].

Genetic

Hereditary deafness is genetically a highly heterogeneous disease with many different genes responsible for auditory dysfunction. It is estimated that 50% to 75% of all childhood deafness is due to hereditary causes. There are two main forms of genetic hearing loss, syndromic and non-syndromic. Children with syndromic hearing loss have other clinical features in addition to the hearing loss. About 15-30% of the hereditary hearing loss is syndromic, while the vast majority is non-syndromic (70%). Genetic heterogeneity has been observed repeatedly in improved understanding of syndromic hearing loss. Mutations of several different genes can cause the identical clinical phenotype. On the other hand, different mutations in one gene can cause variable phenotypes [5,14].

Syndromic Hearing Loss

There are over four hundred described syndromes with hearing loss [18]. The Online Mendelian Inheritance in Man has comprehensive descriptions of the clinical features and molecular genetics of these syndromes as well as an all-inclusive list of references. Some of the syndromes which are

commonly known to be associated with hearing loss are Alport syndrome, Branchial-oto-renal syndrome, Jervell and Lange-Nielsen syndrome, Pendred syndrome, Stickler syndrome, Treacher Collins syndrome, Usher syndrome, Waardenburg Syndrome, Hurler Syndrome & Hunter Syndrome and Down's syndrome [7].

Non-Syndromic Hearing Loss

There are autosomal dominant, autosomal recessive and X-linked forms of non-syndromic hearing loss. In general, recessive inheritance shows pre-lingual onset of hearing loss. And the severity is severe to profound with all frequencies affected. In autosomal dominant forms, the phenotype is less severe and the onset is usually post-lingual. The factors associated with non-syndromic hearing loss are genes for homeostasis, transcription factors, cytoskeleton proteins, extracellular matrix components, mitochondrial hearing loss to name few [19, 20].

Based on Birth History

Prenatal Causes

TORCH syndrome, fetal alcohol spectrum disorders, malnutrition, physical trauma and exposure to radiations in the mother are some of the prenatal causes [13].

Perinatal Causes

The perinatal causes of hearing loss include asphyxia, hypoxia, ischemia, physical injury (forceps delivery, etc), contracted infections during birth, prematurity and/or low birth weight, severe hyperbilirubinaemia, sepsis etc [4].

Postnatal Causes

Childhood infections (meningitis, encephalitis, jaundice, etc.), traumatic brain injury, lead poisoning, allergic reactions to medications, exposure to toxins or other environmental conditions [10] are some of the post natal causes.

Based on Type of Hearing Loss

Conductive Hearing Loss

Conductive hearing loss occurs when the conducting sound waves are attenuated anywhere along the route through the outer ear, tympanic

membrane (eardrum), or middle ear (ossicles). The conductive hearing loss is most often treated medically or surgically. Prolonged conductive hearing loss or in certain conditions sensorineural hearing loss co-exists with conductive hearing loss and is known as mixed hearing loss. Causes of conductive hearing loss include malformation of outer ear/ear canal/middle ear structures, fluid accumulation in the middle ear, impacted wax etc. [12].

Sensori-neural Hearing Loss

Sensorineural hearing loss (SNHL) occurs when there is damage to the inner ear (cochlea), or to the nerve pathways from the inner ear to the brain. Most of the time, SNHL cannot be medically or surgically corrected. This is the most common type of permanent hearing loss. Some of the important causes for sensorineural hearing loss are exposure to loud noise, head trauma, virus or disease, autoimmune inner ear disease, hereditary, aging (Presbycusis), malformation of the inner ear, tumors etc [12].

Major Causes of Hearing Loss in India

WHO (survey4) have listed some of the major causes of hearing loss and ear diseases in India. Ear wax (15.9%) being the most common cause of reversible hearing loss is followed by middle ear infections such as chronic suppurative otitis media (CSOM) (5.2%) , serous otitis media (3%) and dry perforation of tympanic membrane (0.5%). On the other hand 50% of congenital hearing loss causes is attributed to environmental factors (congenital hyperbilirubinemia, ototoxic medication exposure, neonatal hypoxia, viral infections and meningitis) and the rest 50% to inherited (genetic). Approximately 30% of these hereditary cases are classified as syndromic and the other 70% as non-syndromic. The small subset (syndromic) of hearing loss patients (15% of all patients with hearing loss) is the group most readily diagnosed by physicians due to recognizable features other than hearing loss [3, 8].

Urban Vs. Rural India

Rural children in India more often suffer hearing loss than children living in urban areas. A study on Indian school children aged between 12 and 14 years found that 33% of rural children suffered from some sort of hearing loss in comparison to 6% of urban living children. The difference was also observed in the degree of hearing loss where 27 % of the children

from rural areas suffered from moderate hearing loss as compared to approximately 3 % among the urban children. On the other hand 6 % of the rural children and about 2 % of the urban group had mild hearing loss. The significant difference in the prevalence is attributed primarily to the lower socio-economic status of the rural population often leading to malnutrition. Secondary reasons such as poorer health education and inadequate medical facilities increase the risk of hearing problems. Otitis media was the most common cause of hearing impairment in both the groups [16].

Major Reversible/Preventable Causes of Hearing Loss

Following are some of the preventable or reversible causes of hearing loss.

Impacted Wax

Impacted cerumen is when earwax (cerumen) builds up in the ear and blocks the ear canal; it can cause temporary hearing loss and ear pain. Earwax produced by glands in the ear canal helps protect the ear by trapping dust and other foreign particles that could damage the ear. At times the extra wax can build up and harden in the ear canal and would become difficult to remove. Earwax also can become impacted when, during ear cleaning, the wax is accidentally pushed deeper into the ear canal. Along with symptoms of pain, transient hearing loss, itching, it can also increase the risk of outer ear infection. Impacted cerumen needs intervention by an otolaryngologist so as to avoid damaging the ear. Hearing usually returns completely after the impacted earwax is removed [1].

Otitis Media

Otitis media is an inflammation in the middle ear and is usually associated with accumulation of fluid. The fluid may or may not be infected. The Symptoms vary depending upon the severity, frequency, and duration of the condition. In the early stage, thin, clear, non-infected fluid without any pain or fever is observed with a slight decrease in hearing ability. If left untreated, the symptoms worsen and the accumulated fluid is infected and turns into a thick "glue-like" fluid and possible complications such as perforation of tympanic membrane or permanent hearing loss is observed. Hearing loss is nearly always fluctuating in otitis media depending on the extent of infection [6]. Otitis media is considered to be the most common cause of hearing loss in young

children and is attributed to the shorter eustachian tube in children than adults which allows easy entry of bacteria and viruses into the middle ear. Until the eustachian tube changes in size and angle as the child grows, children are more susceptible to otitis media. Wrong feeding postures are one of the major causes of otitis media.

Signs you can look for that may indicate impacted wax or recurring fluid in the ear:

1. Inattentiveness
2. Wanting the television or radio louder than usual
3. Misunderstanding directions
4. Listlessness
5. Unexplained irritability
6. Pulling or scratching at the ears

Drug Induced Hearing Loss

Certain drugs known to be ototoxic induce hearing loss. Most often the hearing loss observed is temporary in nature, unless prolonged usage of drugs. The toxic effect is seen on the sensory and the neural system, inducing sensorineural hearing loss. Hearing loss observed is symmetrical and bilateral. Some of the ototoxic treatment includes antibiotics such as vancomycin, amikacin, and tobramycin. Prolonged use of non-steroidal analgesic anti-inflammatory drugs, chemotherapeutic drugs, quinin and loop diuretics also cause hearing loss [11].

Noise Exposure

The American Academy of Pediatrics note that the infant's exposure to noise in the neonatal intensive care unit (NICU) may result in cochlear damage and may disrupt normal growth and development in premature children. Some evidence indicates that noise exposure and the use of ototoxic drugs such as aminoglycosides are synergistic in producing an auditory damage [17].

Awareness about Causes for Hearing Loss

Among the causes studied, more awareness was present for family history (67%), noise exposure (62%), and ear discharge (61%). Less than 50% of the participants were aware of other causes. 63% were aware that hearing loss could be congenital. Interestingly, 38% of the participants believed that the hearing loss was caused by bewitchment and

31% believed it was because of ancestral sins. Only 20% were aware that hearing loss could be identified at birth, 75% thought that intervention is possible for hearing loss, and 33% believed that hearing-impaired children could attend regular school, if intervened [9]. The statistics are a warning sign and brings forth the myths and misconceptions among the community to be addressed. In addition, it is evident that the early identification is still not given importance.

Conclusion

Hearing loss can thus occur due to various causes. It is well recognized that hearing is critical to speech and language development. Earlier the hearing loss, serious is the effect on the child's life. However, this effect can be minimized by early identification and intervention. Hence, it is essential for the health professionals, parents and caretakers of the children to be aware of the causes of hearing loss. This knowledge would aid in the early identification of hearing loss. The priority place held by primary health care center (PHC) in the Indian health care delivery system, demands more emphasis in educating the professionals at PHC. Further, measures should be taken to clear misconceptions about causes of hearing loss, as it may impede the identification of hearing loss.

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Early Identification of Hearing Loss in Neonates & Children- Information to Non-Audiologists

Heramba Ganapathy Selvarajan*, Aravind Kumar Rajasekaran**

Author Affiliation

*Associate Professor, Department of Speech Language & Hearing, Sri Ramachandra University, Porur, Chennai-600116, Tamil Nadu, India. **Speech therapist, Department of Speech Pathology & Audiology National Institute of Mental Health & Neurosciences (Institute of National Importance) Bangalore, India.

Reprint Request

Heramba Ganapathy Selvarajan, Associate Professor, Department of Speech Language & Hearing, Sri Ramachandra University, Porur, Chennai-600116, Tamil Nadu, India.

E-mail: shganapathy@gmail.com

Abstract

Sprouting of brain happens during critical period. Hearing loss during this period has a devastating effect on the child's development. Early identification of hearing loss is crucial to minimize this impact. Technological improvements have brought in effective identification procedures. However, challenge lies in the execution of efficient programs, especially, in developing countries.

Keywords: Hearing Loss; Early Identification; Universal Hearing Screening; ABR & OAE.

Introduction

Audiologists are the hearing health professionals who are specialized in hearing assessment and providing non medical treatment to improve hearing. Hearing loss in children is a debilitating condition affecting their life beyond measure. Unlike other impairments like visual and orthopedic, it lies hidden for a long period comparatively. Public is ignorant about need for early identification of hearing loss in children, more so in the less developed countries. Hearing loss could occur due to a wide spectrum of causes demanding the screening programs ideally to include all the newborns. In a developing country, the high expenditure towards this universal hearing loss identification program is the biggest roadblock. However, perception towards the early identification of hearing loss should be changed. It is essential to look into the prevalence of hearing loss, advantages/disadvantages of early identification, awareness about early identification & methodologies followed to make the change. Further, the health pro-

fessionals should remain well informed about all these aspects of identification procedures, thereby early identification of hearing loss would become a reality than remaining idealistic in the developing countries.

Prevalence of Hearing Loss

The most common developmental abnormality at birth is hearing loss [15]. Approximately one in every 200 babies born in India has hearing loss [19]. All over the world nearly 32 million children have a disabling hearing loss (40dB or greater) [6]. In school going children the prevalence of hearing loss is about 15%.

Identification of Hearing Loss-The Current Scenario

To add to the dire nature of the high prevalence is the delay in identification of hearing loss in developing countries [4]. In India, the average age of identification of profound hearing loss is above 2 yrs. The age of identification has wide variation

across India. In a study, in West Bengal (India), involving 209 children it was found that the average age of children with hearing loss first seen by an Audiologist is 9.3 years. Further, 20% of the Doctors whom the parents of hearing impaired children consulted, did not suspect hearing loss and suggested that child would naturally develop language by time [13]. In contrast, in a study carried out in Tamil Nadu (India) the age of identification was 2 years. The identification of mild to moderate or unilateral hearing loss would be even later or may never be found at all. The overall impact of late identification/never identified hearing loss is not extensively studied in India. However, it is not difficult to conclude that it would have a devastating effect on the children, the family and the nation as a whole.

In the developing countries early identification and intervention face obstacle due to lack of awareness, resources & supporting services & accounting hearing loss as a low priority problem [19]. Children with hearing loss are generally identified as having speech and language problem overlooking the cause viz., hearing loss. This is especially true when the child has mild to moderate hearing loss, where, the child would respond to loud sounds and loud speech. Parents and health care professionals often are shocked "How did I miss this out for such a long time?" for the symptoms of hearing loss are often subtle and can be confused with behavior issues. Sometimes, even profound hearing loss with obvious symptoms is missed out in the early childhood. Late identification of hearing loss has a negative impact on the child's development [21]. Children in whom hearing loss was identified later are found to have mismatch in literacy and language levels compared to normal children. The children of 12th grade had a reading level of only III to IV grade & language levels of only 9 to 10 year old [17]. Contrarily, identification of hearing loss before six month of age has a positive impact on the language development of the child and could develop near normal speech and language skill [22].

Tools for Identification of Hearing Loss

Hearing loss may not always a medically untreatable congenital condition. It can be due to treatable medical conditions like otitis media, needing appropriate referral. Identification of hearing loss should focus on both presence of hearing loss and also its type. It would be the guide for the selection of appropriate intervention methods. Various tools are available to identify hearing loss in neonates & children viz., objective methods like

oto-acoustic emissions (OAE), auditory brainstem response (ABR) & Tympanometry and, behavioural methods like behavioural response audiometry, visual reinforcement audiometry & conditioning audiometry.

Careful observations of auditory behaviors would provide vital information about the child's hearing. Responses like startle to sound, eye blink, cessation of activity upon hearing sound, searching for the sound source, reciprocation by vocalization and exhibition of pleasure being spoken to are some of the behaviors that can be observed. Though, the observation does not need to be done by a professional but certainly the observer needs to have trained eyes. The knowledge of the auditory behavior is crucial to suspect and refer the child to an audiologist.

Behavioral response, visual reinforcement or the conditioning audiometry is carried out by the professional Audiologists. The specific procedure is decided by taking into account the age of the child and 'testability' of a child using that procedure. These tests are carried out in a sound treated double room. Various sound stimuli are presented via an audiometer and responses are observed.

OAE's are generated by the outer hair cells of the inner ear; incidentally, inner ear damage is the most common cause of hearing loss. OAE testing is the quickest mode to screen for hearing loss. An OAE screening thus would detect for hearing loss both efficiently and rapidly. It is done with a probe placed gently inside the ear canal. The probe has a sensitive microphone and a receiver. Sound is presented via the receiver and the response picked up by the microphone. The response viz., the sound picked up by the microphone is analyzed by the screening unit and displayed as pass or refer [12]. A pass response can be obtained from a normal and healthy ear. When the child is in deep sleep, the total testing time for both the ears including documentation would be just 5 minutes. Though a "fail" response indicates a problem in the hearing mechanism with reference to the cochlea, the results has to be analyzed carefully as a middle ear condition too may render a "fail" result. A referral to the audiologist for a detailed diagnostic evaluation would be appropriate.

The ABR which is otherwise referred as brainstem evoked response audiometry viz., BERA (a misnomer), is an electrophysiological evaluation of hearing. In ABR testing the sound stimuli are presented into the ears through a headphone or an insert earphone. The responses are recorded from electrodes placed on the scalp. The test measures the conduction from the auditory nerve to the level of

upper brainstem. It indirectly provides us with the threshold of hearing, thereby; degree of hearing loss can be arrived to. The test results are displayed as pass or fail in the screening module. If the test results indicate hearing loss it has to be dealt cautiously. A diagnostic audiological test is once again warranted.

Both screening OAE & ABR can be carried out by non-audiologists but qualified health care providers. These tests are advantageous as they are objective and are non-invasive [16]. Based on a study involving 4911 newborns, these screening tests, used independently, have a sensitivity of 90%-100% and a specificity of 94% [6]. Screening through these methods are far more effective than the conventional behavioral methods using noise makers. With proper screening and referral of risk babies to audiologists, babies can be detected for hearing loss and intervened as young as few weeks old.

OAE and ABR are currently used even in developing countries for screening as well as diagnostic evaluation [10]. In Iran, a cross-sectional study involving around 3 million infants revealed a prevalence rate of 3 per 1000 children. The program used transient evoked otoacoustic emissions (TEOAEs) & automated auditory brainstem responses (AABRs) in varied phases. The study revealed decrease in false referral & increase in the follow-up [14]. In a study conducted in China, researchers reported employing a two-stage TEOAE measurement followed by DPOAE; Tympanometry & ABR. 11,894 infants were screened by two-stage transient evoked otoacoustic emission testing. Those who failed were diagnosed by distortion product otoacoustic emission, tympanometry and auditory brainstem response.

Otitis Media in Children

Otitis media with effusion (OME) is a significant contributor for transient acquired hearing loss in children [13]. It is characterized by variable, fluctuating, and mild degree of conductive hearing loss [2]. Almost 50% to 60% of the children may have OME before two years of age. In Indian scenario, it would be left unnoticed especially if the children are from a rural or lower socio-economic background. Hence, a "fail" result in either OAE or ABR or in both should be followed by a tympanometry testing. Further a unilateral "pass" result should not be taken as criteria to conclude normal hearing [7]. Children who fail in the hearing screening unilaterally were sometimes found to have bilateral hearing loss in later life, hence there is a need to follow them up.

Universal Hearing Screening

Parents are not aware that the hearing of their new born needs to be screened. Very few hospitals in India have newborn hearing screening facility. Sometimes certainly not always children are referred based on a high risk register (HRR). Screening the infants only based on high risk register (HRR) is not the perfect method, if we intend not to miss any children with hearing loss [9]. The HRR approach may lose around 50% of the children with hearing loss. India is yet to widely screen all the children falling under high risk criteria. Joint Committee on Infant Hearing (2007) recommends a universal hearing program viz., screening every new born. Though there is no national guideline in India, recently the Indian Academy of Pediatrics has embarked on the importance of implementation of Universal hearing screening [20].

A Universal hearing screening program would be the best method to screen children for hearing loss. However, even it would be a failure, if a foolproof follow-up program is imbibed within it [11]. There is a real possibility that a significant number of children with hearing loss would be left unidentified in the new born hearing screening. Failure to follow up would lead to many children being left out from early intervention program [3]. Hearing screening is not a one-time procedure at birth but to be done from infancy to adolescence. Late onset hearing loss, lately identified and acquired hearing loss stresses the need for the continuous monitoring of children throughout their developmental age as the prevalence increases [3]. The Joint Committee on Infant Hearing, a recommends that a new born screening has to be followed by screening at the age of 4,5,6,8 & 10 other than newborn screening for all the children [18]. It is reported that children with even a minimal degree of hearing loss or unilateral hearing loss face developmental difficulties. In the developing countries like India the problems are manifold. Equipping community level workers and creating the awareness among the parents are the viable options to increase the detection of hearing loss [19]. Further high risk register approach or a testing the children at the immunization clinics are the other viable options for developing countries.

Conclusion

The technological advances and new knowledge acquired in the identification of hearing loss has brought over a positive impact on the lives of children with hearing loss. Many of such advanced practices

are legally mandated in the developed countries. However, implementation of universal hearing screening & follow up program faces many presumed difficulty in developing countries, including India. Nevertheless, those difficulties should not be overemphasized. Policy decisions had to be made considering the advantages of early identification of hearing loss and disadvantages of late identification.

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Effect & Intervention of Hearing Loss in Children: A Short Review

Aravind Kumar Rajasekaran*, Narendra Kumar Mariappan**, Saranya Gunalan**

Author Affiliation

*Speech Therapist, Department of Speech Pathology & Audiology, National Institute of Mental Health & Neurosciences (Institute of National importance), Karnataka. **Assistant Professor, Department of Audiology, MERF-Institute of Speech & Hearing, Chennai, Tamil Nadu.

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Aravind Kumar R.

Speech Therapist, Department of Speech Pathology & Audiology, National Institute of Mental Health & Neurosciences (Institute of National importance) Karnataka.
E-mail: raravindk@gmail.com

Abstract

Hearing loss affects every sphere of child's life, from language development to the social wellbeing. Even a mild hearing loss is observed to cause significant effect. New inventions have brought phenomenal changes in the intervention of hearing loss. However, Challenge lie in providing efficient intervention as early as possible.

Keywords: Hearing Loss; Effect of Hearing Loss; Early Intervention; Hearing Aids; Cochlear Implant; Baha.

Introduction

The hearing modality plays a crucial role in effective speech & Language development. Hearing loss leads to disability in communication, mainly speech. This has a profound impact on an individual's life [1]. The effect is not only on the speech but also leads to learning problems, reduced academic achievement, social isolation, poor self-regard & impact on vocational choices. Contrary to common understanding that only a severe hearing loss affects the child's development, even a mild degree of hearing loss has an irreversible impact, if left untreated. Hearing loss at a younger age affects the child's development than at later age [22]. Further early r the intervention lessens the impact of hearing loss. Improvement in technology has lead to phenomenal success in intervention of hearing loss in children. This article provides an insight into the effects of hearing loss and an overview about available intervention methods for hearing loss in children.

Effect of Hearing Loss in Children

Effect on Neural Maturation

First three years of child's life is generally accepted as the critical period of the development. During this time the neural maturation and plasticity is at its zenith. Efficient input of the auditory system is crucial for the development of central auditory nervous system and other neural substrates involved in the language & cognition. During the sensitive period cellular & synaptic plasticity is well observed all through the central auditory nervous system [29]. Altered auditory input would lead to improper frequency representation in the central nervous system (CNS). Physical changes too have been noted in the CNS [12]. In children with hearing loss a significant white matter reduction in Heschl's gyrus is been reported. The impact on the maturation is long lasting [30]. Children who receive cochlear implant late in life get less benefit compared to the

children who were implanted very early in life. Various animal studies have recorded the changes in the central nervous system due to hearing loss. Loss & shrinkage of neurons in [23] cochlear nucleus and [26] superior olivary complex were observed. These peripheral neural maturational effects would be reflected up in the higher centres [21]. It affects the normal maturation of auditory cortex especially the GABAergic transmissions which is a critical determinant of neural networking and dynamic range [14]. It is important to note that these deficits are also observed in partial hearing loss.

Effect on Speech & Language

Children with hearing loss exhibit varied disabilities in speech & language depending on the degree, pattern of hearing loss, age of intervention & type of intervention [32]. More than 50% of children with hearing loss would present with severe language delay at the school going age [24]. Children with hearing loss were found to have less vocabulary compared to the normal children. The author reported that at 3 years of age a typically normal developing child would produce approximately 210 words and the mean length of utterance (MLU) would be 3.2 words. In contradiction, a child with profound hearing loss would utter only 35 words & the MLU would be only 1.5 words [27].

Penna L.M. et al. studied the auditory and language skills in 110 children with hearing loss of varied degree of hearing loss. The authors reported that the risk of not developing oral language is 6.2 times & 83.1 times more in children with moderately severe/severe hearing loss & profound respectively; compared to children with mild/moderate hearing loss. Irrespective of the degree of hearing loss majority of children had below normal oral and written language skills. In a three years longitudinal study [7], Blamey PJ et al. evaluated 87 primary school children for speech perception, production & other language measures and postulated that if an effective language intervention is not provided those children would lag by about 4 or 5 years, when they enter secondary school.

Effect on Other Academic Skills [27]

Hearing loss has a negative impact on reading, writing, logical and mathematical reasoning [20]. Even a mild degree of hearing loss can have adverse effect on the academic performance [2]. Children with less severe hearing loss may be left undetected at earlier life and its presence would come out only when they exhibit learning disabilities later in school life.

The complexity of the subjects in the class room would increase by increasing grades [18]. It would be a great challenge for these children to decipher meaning as majority of information would be through verbal mode. Although performance of the children with hearing impairment improves by grade their difference with normal children remains.

Impact of a Mild or Unilateral Hearing Impairment

More often hearing loss is thought of only as a severe hearing loss. Even health professional miss to diagnose a mild degree hearing loss or unilateral hearing loss. Hence, mild & unilateral hearing losses are often left undetected or untreated. The ill effects of mild/unilateral hearing loss on the development of the children had been proven [5].

Prevalence of unidentified minimal hearing loss among young school children in a developed country is around 5.4% [9]. Inefficient or poor perception of speech in children with mild/unilateral hearing loss may result in deficits in speech production. Majority of the time it is misarticulations.

Academic difficulties in children with unilateral hearing loss have been widely reported [3,4]. About 35% of these children repeated at least one grade in school & over that 13% of children required assistance for academic difficulties [25]. The rate of academic failure is almost 10 times compared to the normal hearing children. In addition, children with hearing loss in the right ear were found to experience greater academic risk. Further these children may be socially isolate.

In case of children with mild hearing loss they may not exhibit obvious language deficits but may mishear information, have limited vocabulary & difficulty in understanding speech in noise. All these would affect the academic achievements [5]. Bess et al. reported that children with bilateral minimal hearing loss have academic failure rate of around 37% with 8% needing special academic attention over that. Further these children performed significantly poor in reading, language mechanics, word analysis, spelling and science [28]. The academic achievement gap (below 2 SD) between the normal children and the children with minimal/unilateral hearing loss is significant [6,10]. These children had poor vocabulary, reading comprehension, language use, receptive vocabulary, verbal ability and reasoning scores compared to the normal children.

These children also have psychosocial issues that needs be addressed [5]. They feel less energetic, stressed, lower social support & self esteem (Bess et

al. 1998) [17]. The feeling being of stressed & drained out may be due to the high listening effort exerted by these children [16]. Physiological evidence to the fatigue is reported by using physiological measures. Children with hearing loss are more fatigued in a classroom where they are involved in multiple tasks.

The impact of mild/moderate hearing loss on the family and the education is high [11]. The effect on language & the scholastic achievement in these children may not be a transient phenomenon but could extend lifelong. In a study, involving 19 adolescents (aged 11-15yrs) with mild/moderate Sensori-neural hearing loss (SNHL) the researchers compared the language performance of these adolescents with a group of typically developing & a group of adolescents with specific language impairment (SLI). The hearing loss group exhibited language deficits as that of the SLI group. This supports that hearing loss in the early years has a longitudinal effect.

Intervention of Hearing Loss in Children

The conventional interventional therapeutic methods followed by special educators and the speech language pathologist provide the basis of intervention. Though not very recent, auditory verbal therapy (AVT) had added new philosophies to intervention methods. Aural-oral approach, sign language or an eclectic approach is followed in the intervention depending on many factors, especially, the degree of hearing loss. Through age the improvements in technology had led to drastic improvements in the intervention of hearing loss in children. In addition, the current stress on early identification of hearing loss has made these interventions effective. Hearing aids, bone anchored hearing aids & cochlear implants are the common aids used in the intervention.

Hearing Aids

Hearing aid fitting is the most popular and the traditional interventional method for the intervention of children with hearing loss. Paediatric Audiologists face a challenge from the very beginning viz., estimation of the correct hearing threshold. In addition, the hearing aid benefit verification needs a sincere and a specialist approach [2]. To take the advantage of the critical period of development, intervention as early as 6 months of age is desired. Hearing aids are basically sound amplification devices; however, technological advancements have added a wide range of options basically to improve the speech understanding. It is of various types

depending upon technology viz., analogue, programmable & digital and, where it is fitted viz., body level, behind the ear, in the ear, in the canal & completely in the canal. The type of hearing aid is selected based, on the scientific methodology and sometimes on the affordability. There are various formulae which are directive for effective hearing aid fitting. The Audiologists take into account various factors including predicted hearing thresholds, behavioural & electrophysiological hearing aid benefit measures, formulae and others. Fitment of a wrong hearing aid affects the child equally or even more not giving a hearing aid at all. The wrong fitment can damage the ear of its residual hearing or it may lead to poor hearing aid benefit thereby, child rejecting it. It would lead to an unwarranted situation of the parents having informed about the importance of an early intervention and the child denying it. In addition, hearing aid fitting in children is equally science and an art. It demands investment of enough clinical time. The fitting has to be carried out in phases and counselling the parents is as important as that of the correct selection procedure.

Bone Anchored Hearing Aids (BAHA)

^[13]The BAHA system uses an osseointegrated titanium implant into the mastoid portion of the temporal bone. The principle behind these devices is that when the skull is vibrated, here, the mastoid region, the sound energy directly reaches the cochlea through bone conduction. It bypasses the middle ear viz., the air conduction route. It is a mode of intervention, when there is a significant conductive pathology (unresolved for various reasons) and the use of hearing aid not warranted. In conductive hearing loss, middle ear impedes the sound conduction. It may lead to, not enough sound energy reaching cochlea, defeating the whole process of the intervention [13]. This device is effectively used in children with congenital aural atresia. BAHA is of two types viz., the soft band & the surgically placed bone anchored type. The head band type is generally for temporary time duration. It is either fitted before a surgically placed bone anchored hearing aid (BAHA) or during bouts of conductive hearing loss. However, in certain time it is advised for permanent use if the surgery is contraindicated or the parents refuse surgical procedure.

Cochlear Implants

Cochlear implants (CI) are considered as the zenith of technology in the intervention of children with severe to profound hearing loss. This is a bio

electronic device, where a series of electrodes are surgically implanted into the inner ear. The sound is transmitted by the microphone to the speech processor where the processing of the speech signals take place. The processed speech signal is then transmitted to the internal implant via radio transmission and finally reaches the implanted array of electrodes. These electrodes which carry the electrical signal directly stimulate the auditory nerve, thus bypassing the damaged inner ear. With stimulation of the auditory nerve the information reaches the brain and the sound is perceived. Children as young as 12 months old are considered for implantation. The outcomes of children with CI have been tremendous. Critical factors that influence the prognosis includes (1) age at the onset of hearing loss and the duration of deafness, (2) progression of hearing loss, (3) educational setting and (4) unilateral Implantation. It is also seen that these children develop speech and language skills at a rate that is comparable to children with normal hearing. Encouragingly, it was also found that an early intervention before one year of age allows the child to develop language in normal range [8]. In spite of all modifications and improvements in the candidacy criteria over the years, with growing evidences from various research studies being carried out worldwide, there is a dire need for reassessment of the paediatric CI candidacy in order to make CI available for many children. However, the success of CI lies on the implementation of the stringent candidacy selection.

Conclusion

Effect of hearing in various dimensions of life in children had been widely reported. Though children with more severe hearing loss may face more challenges, the effect of milder hearing loss is still not looked into in the developing countries. With the advent of new technologies the effect of hearing loss on the children's life can be efficiently minimised. Health care professionals ought to be aware of the effects and the interventional methods, so as to, provide valuable information to the parents without any delay.

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author@rfppl.co.in

author.rfp@gmail.com

Speech Disorders in Children: A Short Review

Havilah Jayakumar*, Neeraja Karthi**

Author Affiliation

*Speech - Language Pathologist
Department of Neurology
Bangalore Medical College and
Research Institute, Bangalore,
India. **
Consultant Speech- Language
Pathologist, Shanthi Hospital
and Research Center, Bangalore.

Reprint Request

Havilah Jayakumar,
Speech - Language Pathologist
Department of Neurology
Bangalore Medical College and
Research Institute, Bangalore,
Karnataka 560002.
E-mail: jpshavi@gmail.com

Abstract

Speech is a form of communication which is done verbally. A Speech-Language Pathologist is concerned with the assessment, diagnosis and management of the disorders pertaining to Speech and Language. Speech is a unique act performed by humans with the co-ordination and normal functioning of the respiratory system, phonatory system, articulatory system, resonatory system and nervous system. To understand the disorders of speech it is essential to know the components of Speech, which are fluency, articulation, voice and prosody. Each component plays an important role in normal speech. When there is a breakdown in one or more components it results in a speech disorder. Disorders of speech can be a result of structural and/or functional abnormalities. When a child is suspected to have disordered speech, an SLP will examine thoroughly. Informal and formal tests will also be administered as and when required. Suitable therapeutic strategies are then employed or suggested for intervention. A multidisciplinary team approach right from suspicion of a disorder, to management would give the best outcome for the child.

Keywords: Communication; Speech; Language; Speech Language Pathologist, Speech Disorders; Fluency; Articulation; Voice and Prosody.

Introduction

Communication is the exchange of information. Speech is a form of communication which is done verbally. Language is made up of socially shared rules. Speech disorders refer to several conditions in which a child has difficulty in forming or creating speech in order to communicate with others. Disorders of articulation, fluency and voice are the major and the most common forms of them. According to the Census Commission (2005), 0.16% of the Indian population presents with speech disorders [5] and is common in rural India [22]. As health care professionals, one would encounter many patients who have communication disorders as a co-existing condition, if not as the primary concern. Therefore it is very important to understand these disorders in order to give adequate patient guidance.

In this article we would be reviewing speech

disorders in children. It will furnish the reader with information regarding the types of speech disorders and referring the child to the concerned specialist- the Speech language Pathologist. A Speech-Language Pathologist is concerned with the assessment, diagnosis and management of the disorders pertaining to Speech and Language. This paper will limit itself to describe speech disorders in children.

Systems of Speech

Anatomically there are five main sub-systems that contribute to the production of speech. They are the respiratory system, phonatory system, articulatory system, resonatory system and nervous system. The speech subsystems have speech production as an overlaid function over their primary functions [20].

The respiratory system with its primary function of respiration has a superimposed function of

supporting speech. It supplies air, the source of energy for speech production. The air supplied is used by the other subsystems to produce speech. Laryngeal framework forms the phonatory system. It is basically involved in the protection from particles other than air entering the lungs, stabilization of torso during physical exertion and modification of the upper airway to enable adequate gaseous exchange. The overlaid function above this primary function is the generation of sound. The vocal folds in the larynx uses the air trapped beneath it to set itself into stream of vibrations, producing voice.

The articulatory system is the combination of structures that are used to shape the sounds of speech. It includes the lips, tongue, hard and soft palates and the upper and lower jaws, and teeth. The primary functions of these structures are related to vegetative functions viz., chewing, biting, blowing & swallowing.

This is followed by the resonatory system. It encompasses vocal tract, pharynx, nasal and oral cavities. It adds resonance to the crude sound provided by the vocal cords.

The nervous system for speech includes motor and sensory control of the various structures involved in speech production. An integrated functioning of all these systems is essential for speech production.

Components of Speech

Speech can be divided into four primary components: Fluency, Voice, Articulation, and Prosody. Below is the description of each of these components and it's disorders.

Fluency

There are two kinds of fluency viz., Linguistic and Speech fluency; here we are concerned with speech fluency. Starkweather [16] defines speech fluency in terms of continuity, rate, duration, co-articulation and effort. In other words, fluency is the act of speaking effortlessly, smoothly and easily without hesitations, interjections, filler or blocks. Disorders that affect fluency are stuttering and cluttering. Stuttering is more of a disruption in the flow of speech, while cluttering is a fluency disorder considered to be due to a central language imbalance [21].

Stuttering is a disruption in the normal flow of speech or normal fluency. For e.g. "My name is a.a.asha" or "My name name is ashaa.sha". It is of two types ie., developmental and acquired. Developmental stuttering is observed in children that

continue into adulthood. Acquired stuttering is caused by brain damage. Speech disruptions can be repetitions (can be sound, syllable, word or part-word repetitions), prolongations, silent pauses, filled pauses (eg: mmmmm). Persons with stuttering show associated physical behaviors called secondaries while attempting to prevent stuttering or come out of them once they begin talking. These may include eye-blinks, breathing movements, facial tremors etc. These behaviors are more during stressful situations.

Another type of disruption in fluency is called "disfluency". Normal non-fluency is typically seen in children between two and seven years of age. They show very little disfluency without any awareness, no associated tension or struggle. The disfluencies in them are mostly interjections, whole-word repetitions and revisions [7]. Unless evaluated by a Speech Language Pathologist, it is very difficult to identify whether the child is "disfluent" or "dysfluent". It is therefore essential to refer a child once a disruption in the normal flow of speech is observed.

Cluttering or tachyphemia is a fluency problem in which a person's speech is too fast and irregular. Their speech is understood by the listeners with great difficulty. They are unaware of their difficulties, unlike the stuttering group. Hence many of them are not diagnosed until they enter their adulthood. It can also co-occur with stuttering [2].

Voice

It is the audible sound that is produced by the vocal cords. The parameters of voice are pitch, loudness & quality. These are the psychophysical correlate of frequency, intensity & timbre respectively. Voice is considered abnormal when one of these or all is affected. Both structural and functional abnormalities can lead to voice disorders. Voice disorders in pediatric population are often neglected by health professionals. However, it has to be remembered that voice changes can be permanent. Further it would lead to a negative effect on the social life of these children [4].

Voice disorders in childhood could be congenital as well as acquired. Based on the etiology voice disorders can be viewed as organic and psychogenic.

A speech pathologist will assess the parameters of voice using perceptual (rating scales), acoustic (quantification of fundamental frequency, intensity etc), aerodynamic measures (airflow, laryngeal airway resistance) and endoscopic measurements [13]. The speech pathologist would compare the findings with that of the observations of the pediatric

Table 1: Classification of voice disorders [27]

Organic	Psychogenic/ Functional
<i>Congenital malformations/anomalies:</i> Atresia, cri du chat, laryngomalacia, Subglottic stenosis, laryngeal web, laryngeal cleft, papilloma, laryngocele, mongolism, laryngeal sacculae, lymphangioma, Subglottic hemangioma, and ectopic thyroid gland. <i>Inflammatory conditions of the vocal folds such as laryngitis, vocal fold nodules etc.</i> <i>Benign and malignant neoplasms</i> <i>Metabolic conditions</i> <i>Trauma-contact ulcers, vocal nodules etc.</i> <i>Sulcus vocalis</i> <i>Neurologic conditions: Cerebral palsies, childhood strokes etc.</i>	<i>Emotional stress- Musculoskeletal tension:</i> Vocal abuse and misuse, vocalcraque, contact ulcers, and vocal nodules. <i>Psychoneurosis:</i> Mutism, falsetto (high pitched) voice, and puberphonia (seen in adolescent males).

otolaryngologist and thereafter advice and employ suitable therapeutic principles as and when applicable. Children with voice disorder may present with symptoms like hoarseness, excessively loud voice without reason, effortful voice, voice breaks during singing, vocal tiring or deep voice as compared to the peer group.

Here, it is essential to indicate that stridor (noisy inhalation) has to be differentiated from other (above specified) pediatric voice disorders. Such voice symptoms indicating airway interference or swallowing difficulty must be immediately brought into medical intervention [12]. It is important to use child-friendly language to assess older children for pediatric voice disorders. Dysphonia that is intermittent (worse in the morning than at night) can be indicative of gastro-oesophageal reflux disease. For example, terms like "sour-burps, mini-throw-ups" can be used to assess reflux related symptoms that may help to obtain useful details for differential evaluation [15].

Articulation

It is the motoric execution of the articulators to produce correct pronunciations. Persons with articulation disorder are presumed to experience difficulty in producing speech. For e.g. a child with an articulation disorder might not be able to shape his or her articulators in such a way as to pronounce /st/ in the word "stop". Sounds can be substituted, left off, added or changed. These errors may make it hard for people to understand the child's speech.

Articulation disorders are mainly caused by organic etiology and to an extent functional as well. Amongst the organic causes for misarticulation is cleft lip and/or palate, ankyloglossia (tongue tie), congenitally deformed tongue or soft palate such as a short palate etc., neurogenic disorder which cause damage to the nerves supplying the articulators or

childhood apraxia of speech (poor motor planning and sequencing), as might be the case in children with cerebral palsy, syndromes such as Down's syndrome, developmental disorders and children with hearing loss as well.

The functional causes of misarticulation have to do more with phonology than articulation. During the first few years of life when the child begins to learn sounds he or she may make errors in pronouncing a word correctly, which are usually termed as phonological processes and if prolongs into later childhood becomes a phonological disorder- this is linked to language processes and not speech. The terminology "phonological disorder" should not be confused with "articulation disorder". Articulation disorder is at the level of motor act of producing vowels and consonants. Phonological disorder is a language disorder and it happens at the cognitive level; difficulty arises in the organization of speech sounds [3]. It is wise to remember here that both articulation and phonological disorder can occur in the same child. However, the terms should not be interchangeably used.

When one finds a child with the chief complaint of unclear speech or mispronunciations, it is advisable to refer him/her to a speech-language pathologist who will evaluate the child's speech and diagnose the condition and give further guidance on the lines of management.

Prosody

It is a term that refers to suprasegmental aspects of speech including variations in pitch/ fundamental frequency, loudness/ intensity, duration, pause/ silence, intonation, rate, stress and rhythm of speech. Dysprosody or impaired prosody occurring in isolation is hardly seen. However, it occurs in unison with impairments of the other components of speech.

Children with autism [10], apraxia [1], hearing loss [9], right hemisphere damage [20] or Down Syndrome [18] may exhibit features of impaired prosody. Prosodic deficits in children often affect others' social perception about them as well as pose hurdles in mainstream integration [6].

The unnatural speech models that are often used in therapy for achieving the speech targets are gradually modified and reduced to natural speech as the naturalness in speech is the ultimate aim in intervention. Targeting prosody is the ultimate in speech intervention practices.

Assessment of Speech

A Speech language pathologist assesses the speech before arriving at a diagnosis of the pathology involved. Assessing the pediatric population is a challenging task. In most cases children who have a speech disorder will have to be screened for a potential language deficit.

The following protocol is recommended by the ASHA (American Speech-language and Hearing Association) 2004:

- Case history, including medical status, education, socioeconomic, cultural, and linguistic backgrounds and information from teachers and other related service providers
- Patient/client/student and family interview
- Review of auditory, visual, motor, and cognitive status
- Standardized and/or non-standardized measures of specific aspects of speech, spoken and non-spoken language, cognitive-communication, and breathing and swallowing function, including observations and analysis of work samples (*whichever indicated*)
- Identification of potential for effective intervention strategies and compensations
- Selection of standardized measures for speech, language, cognitive-communication, and/or swallowing and breathing assessment with consideration for documented ecological validity and cultural sensitivity
- Follow-up services to monitor communication and swallowing status and ensure appropriate intervention and support for individuals with identified speech, language, cognitive-communication, and/or swallowing disorders

Following these guidelines there are proformas, questionnaires, and standardized test for the Indian population which will be utilized to get a

comprehensive repertoire of the child's speech. Objective measurements using instrumentation may also be used to assess different components of speech.

Intervention

Management of speech disorders is the most crucial aspect as it decides the prognosis. There are general therapy techniques as well as specific and goal oriented techniques.

The first step to a good management program is keen observation. After which a broad lesson plan is prepared, which includes short and long term goals. The therapist then decides appropriate activities that will cater to the interest of these goals. Each disorder of speech will follow a different course in management.

Therapy can be intensive and short term or laid-out and long term, depending on the availability of therapists and the nature of the disorder. In certain conditions, surgical management (eg: ankyloglossia, vocal fold cysts, cleft lip and palate) precedes speech intervention in pediatric population.

There are some controversies with respect to the speech intervention practices. For instance, recently the use of oral-motor exercises for improving speech in children has been extensively questioned. It is doubted that non-speech techniques are of use in improving children's speaking skills [8].

Early intervention is generally more effective than waiting for these children to overcome the disorders. For instance, many times, misarticulations can be the result of habitually used incorrect sound pattern. With early intervention, these errors are often quickly eliminated, especially for school-age children.

Conditions like childhood apraxia require long term therapy with intensive drilling and intervention practices. Progress is often slow with some developing normal speech patterns and others with residual errors affecting their academics as well. Such children may require continued intervention and support for easy transition into young adulthood.

At times, SLPs act realistically by discharging a child from therapy when he or she has learnt all the speech targets but still sounds imperfect. For instance, a child with apraxia of speech may have mastered the articulatory targets and sound intelligible, however their prosody may be imperfect. In such cases, they are dismissed from speech intervention programs knowing that they have reached their full potential.

Team Approach

Speech-Language Pathologists collaborate with

other health care professionals, often working as part of a multidisciplinary team, providing referrals and information to health care professionals (including physicians, dentists, nurse practitioners, nurses, occupational therapists, dietitians), educators, behavior consultants (applied behavior analysis) and parents as dictated by the individual client's needs. For e.g. the treatment of patients with cleft lip and palate demands interdisciplinary approach with speech language pathologist plastic-surgeons, dietitians, social workers etc.

Conclusion

Health care professionals ought to understand the need to give due importance to these conditions at a young age and guide the parents to a qualified Speech Language Pathologist. Earlier the referrals better the prognosis.

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Language Disorders in Children: A Brief Outlook

Neeraja Karthi*, Amudhu Sankar**

Author Affiliation

*Consultant Speech- Language Pathologist, Shanthi Hospital and Research Center, Bangalore.

**Assistant Professor,
Department of Speech, Language and Hearing Sciences, Sri Ramachandra University, Porur, Chennai, Tamil Nadu, India, 600116.

Reprint Request

Neeraja Karthi,
Consultant Speech- Language Pathologist, Shanthi Hospital and Research Center, Bangalore, Karnataka 560070.
E-mail: neerajaslp@gmail.com

Abstract

Speech - Language Pathologists (SLPs) have shown keen interest in childhood language disorders for more than 40 years. It has become a common scenario today to find that children experience pressure during language development. In addition, a rapid increase in the number of communication disorders in children during the recent times is threatening. Although this condition has gained popularity and understanding in the west, it is yet to attain complete awareness in the Indian context. The aim of this article is to facilitate understanding of these disorders among the health professionals and public to favor early identification and intervention of these children in Indian conditions.

Keywords: Childhood Language Disorders; Early Identification and Intervention ; SLPs.

Introduction

Communication is the very essence of humanity and this unique ability to communicate via language separate them from other species. Acquisition of this natural "language" is an effortless process. Though language disorders is not uncommon in children there is an overall lack of awareness about it amongst the parents, teachers and even among health care professionals. There is a crying need for early identification and intervention of these children. The current article is aimed to provide basic knowledge about language disorders in children, thereby, helping them to make appropriate referral and treatment decisions.

Definition

As the term implies, childhood language disorder refers to a difficulty in understanding and use of a spoken or written system in children. The disorder may involve the form of language (phonology,

syntax, and morphology), its content or meaning (semantics), or its use (pragmatics), in any combination [4]. In general, a child is said to have a language disorder when his or her language skills do not develop according to fairly well-defined milestones. When there is any communication difficulty due to diverse culture, regional or social dialects, it is not considered as language disorder.

Prevalence & Incidence

Prevalence rates for language delay in children differ widely across the globe. Various studies conducted in the USA reported that prevalence rates ranged from 2.3% to 19% for children under 5 years [24, 12, 14]. A study conducted in the U.K points out that the untreated speech and language delay can lead to persistent language disorders in 40-60% of preschool children [17]. In the Indian context, speech and language delay was found to be 16.27% in children and the male to female ratio to be 2.76:1 [22]. In a door to door survey in rural India [15], the prevalence of speech-language disorder was 9.42%.

They were most commonly found to have childhood language disorders and reading/writing difficulties.

Etiology

Speech and language disorders can be either congenital or acquired. Congenital factors include family history of language disorders, premature birth, low birth-weight, anatomical abnormalities, hearing loss, intellectual disabilities, genetic syndromes like Down syndrome, neurologic impairments [21]. Any illness (meningitis), injury (brain insult) and environmental deprivation (inadequate language stimulation) may cause acquired language disorders.

Classification

Language disorders in children can be classified based on etiology, language aspect that is impaired (form, content and use), whether receptive or expressive language or both are affected and severity of language disorder [6].

Based on the etiology, they can be further classified as primary language impairment such as a language difficulty without any other associated disability (Specific Language Impairment) [3, 18], language impairment secondary to other conditions such as low IQ, Genetic disorders (like Down syndrome), Hearing Impairment etc. These disorders can also be classified as either Developmental (present from birth like Autism, Attention Deficit Hyperactivity Disorder) or Acquired (sometime after birth, result of injury or brain insult).

Disorder Characteristics

Children with Specific Language Impairment (SLI) fail to develop age-appropriate language despite being normal in all other areas [6]. They exhibit slow vocabulary development and word finding difficulty. There is a wide gap between their comprehensive and expressive language age. These children have problem in grammatical production and comprehension, especially verbs. They also exhibit poor social skills, behavior and attention.

Children with Intellectual Disability [2] exhibit problems in language, cognition, social and adaptive behaviors and activities of daily living. There are four levels of Intellectual Disability that range from mild/moderate to severe/profound.

Children with Autistic Spectrum Disorder (ASD) [2] exhibit varieties of conditions characterized by difficulties in social relationships, communication, repetitive behaviors and overly restricted interests.

They have severe problems with social and communication. These problems must exist from early childhood.

Children with Attention Deficit Hyperactive Disorder (ADHD) [2] are one of the most common childhood disorders. Symptoms include difficulty staying focused and paying attention, difficulty controlling behavior and hyperactivity. These symptoms must be present prior to the age of 12 years.

Acquired childhood aphasia occurs due to cerebral insult after birth when the language development has already begun [13]. It can result from etiologies such as head trauma, brain tumors, infections, cerebro-vascular accidents, epilepsy [19]. Until the onset of this illness, these children would have gained age-appropriate language skills. Traditional description [1] supports non-fluent symptoms (mutism, lack of spontaneity in speech, non-fluent speech output, telegraphic speech) in these children. However, there are recent claims of fluent aphasia like characteristics (neologism, jargon etc) similar to adult aphasia [26]. Acquired brain insult compromises not only language but also cognition, executive and behavioral functions in these children [11].

Children with comprehension language deficit [3] may have trouble in understanding what gestures mean, following directions, answering questions, identifying objects and pictures, and turn taking during conversation. Children with expressive language disorder [3] may have trouble in asking questions, naming objects, using gestures, putting words together into sentences, learning songs and rhymes, using correct pronouns, like "he" or "they", narration and grammar usage. When both comprehension and expression of language are affected with respect to form, content and use, it is labeled as Mixed Receptive and Expressive Language Disorder (MRELD) [3].

All of the above mentioned disorders can vary in their severity. While a child with mild language difficulty will have lesser problem in functioning at his or her home or school, a child with profound language impairment would have minimal or no language skills to participate at home, school or in the community.

Assessment

A comprehensive speech and language assessment in children would ideally integrate all the gathered information via case-history, family interview, sensory, motor and cognitive assessment, ecologically valid and culturally sensitive

standardized and non-standardized measures of speech and language (spoken and non-spoken) and cognition, identification of candidacy for suitable intervention programs and follow-up services to monitor communication and cognitive status to ensure appropriate intervention and support for these individuals with speech, language and cognitive impairment [5]. Speech - Language Pathologists (SLPs) use a variety of language assessment tools in order to determine whether a language disorder is present in a child or not. Some of the most popularly used language tools include Clinical Evaluation of Language Fundamentals - Fifth Edition (CELF - 5) [10], Preschool Language Scale (PLS -5) [27], Peabody Picture Vocabulary Test - 4 (PPVT - 4) [9] etc. There are various tests available which are disorder specific like Autism Behavior Checklist (ABC) [16], Children's Acquired Aphasia Screening Test (CAAST) [26].

In Indian scenario there are few published test materials used for assessing specific language components. Some of them are Linguistic Profile Test to evaluate the phonology, semantics and syntax components of language [23], Language Evaluation Scale Trivandrum (covers language development milestones from 0 to 3 years) for children aged 0-3 years (LEST (0-3) [20].

The diagnostic criteria for speech-language impairments are defined by the *Diagnostic and Statistical Manual of Mental Disorders*, 5th edition [2], which specifies the criteria for communication disorders. Both receptive and expressive language domains are separately assessed to identify language skills at specific age levels such as infants, preschoolers, and school age children.

In addition to the formal assessment tools, SLPs incorporate informal language assessments, screening checklists, parental questionnaires and parent child interactions. Above all, direct interaction with the parents & observation of the child's language behaviour in a natural setting is the key for the appropriate referral which in turn facilitates early identification & intervention. Further, wide range of these language disorders require input from a multi-disciplinary team to clearly understand what the condition is and what can be further done.

Intervention

The complex nature of language disorder demands the intervention to be both structured and eclectic. For an effective childhood language intervention program, team approach guarantees the maximum

benefit. The team may include SLPs, Occupational Therapists, Physiotherapists, Audiologists, Clinical Psychologists, Social Workers, Parents, Special Educationists etc.

There are a variety of language intervention approaches available for specific deficit in language areas. The therapeutic approaches can be either developmental or structured, both aim to facilitate a child's communication ability. The goals selected for these children during therapy are individual specific and based on the language symptoms manifested by these children. In the developmental approach, the clinician compares the child's current level of language functioning with the typical language milestones. The target language behaviors are then selected based on the age at which the child fails developmental milestones. SLPs work to enhance functional communication in this well-integrated functional language intervention. In this approach, day to-day language features used in home/classroom are adapted to reinforce language learning in a natural environment.

Therapy possibly focus on increasing child's understanding and use of language, training caregivers, family members, and teachers ways to communicate with the child, helping the child use other ways to communicate when needed. This is essential as it helps the child to generalize what he or she has learnt during therapy to outside situations (school, friends). Targets may include simple gestures, picture boards, or computers that say words out loud. This is also called Augmentative and Alternative Communication, or AAC.

One of the common intervention strategies is modeling that provides focused stimulation on the speech or language targets selected for an individual child. Cueing is another frequently used technique which uses direct and indirect verbal cues (eg, asking a child to imitate a sound, word, or utterance) or nonverbal cues (eg, giving a child a box with a desired item that can't be opened without help).

As children undergo therapy, a periodical re-evaluation is necessary in order to find the child's progress through intervention. *Individualized Family Service Plan* (IFSP) for infants and toddlers and *Individualized Education Plan* (IEP) for preschool and school aged children can be adapted to provide a structured therapy program for parents of children with language disorders .

Reviews on childhood language interventions practices from 21 studies revealed that clinicians have some assurance in specific language intervention practices [8]. Imitation, modeling and

evoked production showed larger effects in children with expressive language difficulties. The outcomes of long term goals depend on the type and severity of language disorder.

Children with language disorders are at a high risk for social, behavioral, emotional, and cognitive problems in their later years [7]. Thus, it is important to screen toddlers for language delay and enroll them in early intervention programs to improve their language performance. Those children who reach age adequate language by early school age are less likely to have reading and writing issues than those whose language disorder persist into school years. Thus early identification and treatment are essential for all children with language disorders as acquisition of adequate language skills also promotes learning, behavior, self-esteem, and social skills in them.

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Psychosocial Issues of Parents of Children with Communication Disorders: A Family Perspective

S. Ubahara Sahayaraj*, Ameer Hamza**

Author Affiliation

*Cohort Manager,
Centre for Addiction Medicine,
**Additional Professor,
Department of Psychiatric
Social Work, National Institute
of Mental Health and Neuro
Sciences, (Institute of National
Importance), Bangalore-560029.

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S. Ubahara Sahayaraj, Centre
for Addiction Medicine,
National Institute of Mental
Health and Neuro Sciences,
(Institute of National
Importance), Bangalore -
560029 Karnataka.
E-mail:
sahaiinimhans@rediffmail.com

Abstract

Intervention of children with disability should be holistic. Rarely, wellbeing of the family is given its due importance. The impact of the disability on the family members is always overlooked. Communication disorders in children pose a significant challenge to the family as a whole and measures should be taken to address this issue. Failure of which, would ultimately have its negative impact on the progress of child with communication disability.

Keywords: Psychosocial Issues; Parents; Communication Disorders; Intellectual Disability; Autism Spectrum Disorders (ASD), Family.

Introduction

Wellbeing of the family and the child is intimately connected. Functions of the family would be affected, when one of its member have chronic illness, which increases exponentially, if the affected one is the child. The process of parenting starts from the conception of child beginning with expectation. Parents invest lot of their energy and resources for the wellbeing of child during the pregnancy. Hence, when they come to know that their child has disability, they show behaviors/emotional reactions ranging from denial to depression. It may lead to multiple consultations, which ultimately would deny the child, the advantage of early intervention. Further, they succumb to a deep distressing situation and may have psychosocial issues, which would require psychosocial interventions.

Communication disability could be an isolated condition or it could be one of the multiple disabilities.

Intellectual disability and autism spectrum disorder form a significant group in children with communication disorders. They are frequently encountered in child psychiatry settings. This article outlines the psychosocial issues of parents of children with communication disorders, with specific reference to intellectual disability and autism spectrum disorders (ASD).

Intellectual Disability & Autism

Intellectual disability is characterized by "significantly sub-average intellectual functioning, existing concurrently with related limitations in two or more of the following adaptive skills areas: communication, self-care, home-living, social skills, community use, self-direction, health and safety, functional academics, leisure and work"[11]. Autism is a neuro - developmental disorder defined by impairments in social and communication development, accompanied by stereotyped patterns

of behaviour and interest [24]. As intellectual disability and autism are in the same spectrum of developmental disorders, parents show similar kind of psychosocial issues.

Psychosocial Impact on Parents & Family

Chronic illness and disability negatively impacts families and family functioning [26]. In families dealing with a child with chronic illness or disability, parents focus a lot of attention on the child, and risk ignoring their own relationship needs and the needs of their partner [18]. Caregivers of children with ASD require coping with the physical and emotional demands of caring for a child with ASD. Their self-confidence and self-esteem could be eroded in the face of totally unfamiliar child behaviour and unique demands. A person, who is in high conflict marriage, might be more likely to engage in unhealthy behaviours like, smoking and alcohol consumption [6,16].

Parents of the child with ASD often experience helplessness; feelings of inadequacy and failure; anger; shock; guilt; frustration; and resentment [8]. These parents/caregivers have been reported to have less marital happiness. On comparison, parents of children with ASD were reported to have lower marital happiness, family adaptability and family cohesion than parents of children with Down's syndrome, and normally developing children. At the same time the cohesion and adaptability for all three groups fell, within the healthy family functioning range [7]. Here, it should be noted that the high levels of family cohesion could lead to enmeshment, a maladaptive family function [14].

A child diagnosed with ASD may represent a constant source of stress on the family unit. It is not only the caregivers were affected, but also the siblings and relationships among the family members. Hardiness and social support are considered as the predictors of stress in mothers of children with autism, and children with intellectual disability [19]. The three most stressful factors for the parents are, a) permanency of the condition b) Lack of acceptance of autistic behaviour by society and family members; and c) low levels of support provided by health care services and other social services [20]. In other dimension, stress could be a result of the extremely antisocial, disruptive behaviours associated with ASD, such as self-injurious, tantrum and obsessive/compulsive behaviours, which may disrupt a normal family life [19]. Characteristics of children with ASD and behavioural manifestation of these tendencies

make social outings for families difficult. This is likely to place additional stress on families, and create conflict within the family system. If families are not able to engage in joint activities with both the child with ASD and other siblings, they will tend to score low on the measure of family functioning, indicating a risk of the family being disconnected, or not responsive to the needs of all the members' [9].

The psychological distress was significantly higher for mothers, when compared with fathers. Perceived social support from friends were significantly different for fathers and mothers. Coping patterns were more negative distraction for fathers, whereas, for mothers it was more of denial and blaming. Daily care stress and family emotional stress were found more in mothers. Parents whose children were above 10 years were found to have higher level of social stress. Parents of severely autistic children had high levels of daily care, social and financial stress [23]. A study focussed on both the parents, who had children with intellectual disability, it was found that they experience a greater level of stress relating to their children, compared to parents of children without disability. The stress of fathers and mothers was associated with aspects of family functioning as perceived by themselves and their spouses [4].

Parents of children with intellectual disabilities are prone to psychiatric conditions. A comparison between parents of children with intellectual disabilities (n=32) and parents of typically developing children (n=29), revealed that the parents of children with intellectual disabilities had high depression and anxiety scores. Further majority of them met the criteria for possible clinical depression and/or anxiety. The strongest predictor of psychological morbidity was caregiver burden. Another indicator for psychological morbidity was feeling of guilt, indicated for the greatest consequence for depression and anxiety. Poor social support and more problematic child behaviors were associated with increased psychological morbidity in parents caring for a child with an intellectual disability [5].

The degree of psychosocial issues faced by the parents varied as the degree of the disability varied. In a study, conducted among the parents of children with intellectual disability it was found that, a) the levels of psychosocial problems faced by parents of intellectual disability increased with the level of intellectual disability of the child studied b) parents of moderately intellectual disabled children registered more problems in all aspects compared to parents of children mildly intellectual disability. Further, parents of children with mild intellectual

disability were more concerned on focussed preventive and adjustment, whereas, parents of children with moderate intellectual disability were concerned with lifelong adjustment, financial security, that included benefits provided by the Government to the child [22].

Impact of having a child with intellectual disability on the family describes that the indispensable importance of interaction between the child and, family and community. It starts right from the birth and expands throughout the life [10]. Parental attitude towards intellectually challenged children explained that the birth of a child with intellectual disability shattered the hope and aspiration of parents leading hopelessness and negative attitude towards the child [17]. Parents felt that raising a child with disability is time consuming and often emotionally draining. Often they choose not to have another child or spaced their children widely, in order to meet the needs of their child with disability better [12].

Protective Factors

Patterson (1991) had listed out positive family processes contributing to the good outcomes in children with chronic illness and disability. They are, (a) balancing the illness with other family needs, (b) maintaining clear boundaries, (c) developing communication competence, (d) attributing positive meaning to the situation, (e) maintaining family flexibilities, (f) maintaining family cohesiveness, (g) engaging active coping efforts, (h) maintaining social supports, (i) developing collaborative relationship with the professionals [15]. In a similar manner, though there are psychosocial issues that are obviously affecting the parents and their families, these parents also exhibit protective factors. Protective factors, namely family closeness or connectedness, caregivers coping skills, mutually supportive relationship, clear family organization and direct communication about the illness were observed. The strongest risk factors were conflict or criticism, psychological trauma related to disease, external stressors, family isolation and disruption of developmental tasks by the disease and, rigidity or perfectionism. Hence, family intervention programmes should target these protective and risk factors [25].

Adaptation Process

Devising an effective intervention program requires knowledge about adaption process and its

stages. The process of adaptation takes a longer time, as it depends upon the particular parents' psychosocial environment. ABC-X model postulates that the bon-adaptation occurs when there is " (a) maintenance or strengthening of family integrity; (b) continued promotion of both member development and family unit development; and (c) maintenance of family independence and its sense of control over environmental influences". Maladaptation, however results when there is, (a) deterioration in family integrity; (b) a curtailment or deterioration in personal health and development of the member or the well - being of the family unit; or (c) a loss or decline in family independence and autonomy . This model must be seen as a dynamic model rather than a static one. This means that stressors, resources, and perception of the families are ever changing and in constant interaction with each other. Thus professionals must keep in mind about the dynamics involved in dealing with such families [13].

It is hypothesized that parents may move through several stages of adjustment adapting to birth of an infant with a handicap. First stage would be shock and denial, second would be involving a period of disorganization bringing out emotions like anger, grief and guilt and the final stage would be acceptance. The rate and the pattern of adjustment process may be varied and dynamic. The emotions that the parents experience appear and disappear and again may reappear unexpectedly or triggered by the medical and behavioural crisis of the child. Hence a prompt and supportive intervention is necessary [2].

Psychosocial Interventions

Intervention with any family members is in fact intervention given to the whole family [1]. Ignoring family functioning would result in increasing the problems in the family as a whole [3]. Meta-analysis of 'caregiver's (n=78) intervention studies' representing six different types of interventions for different illness revealed significant improvement across six outcomes variables namely, a) caregiver burden b) depression c) subjective well -being d) perceived caregivers satisfaction e) ability/ knowledge and f) patients symptoms. These studies suggest that providing education and support for family caregivers is necessary, but not sufficient to reduce their burden and improve their emotional health. Family caregivers need more intensive interventions that include skill training assistance with problem solving [21].

Conclusion

Wellbeing of children and the family are interrelated. Communication disorders in children affect the family and a dysfunctional family leads to further deterioration of the child's condition. Appropriate and continuous intervention for the parents should be initiated at the earliest. Health care institutions like hospitals & nursing homes and, the health care professionals are generally patient centric. They work on the dysfunctions of the individual. However, communication disorders in children are known to cause negative psychosocial impact on the family. Parents/caregivers may show symptoms of depression, anxiety, stress and guilt or marital/family issues. Awareness should be created among health professionals to give attention to these issues and make appropriate referrals. Overlooking the psychosocial factors may ultimately affect the child with communication disorders as it erodes the very basis of their support, the family.

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