

# Prevalence of Communication Disorders in primary School children in the Urban area of Dharwad

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Dr. Jijo Pottackal Mathai <sup>1</sup>- Implementation of the research, Manuscript revision, <sup>22</sup> analysis and interpretation of data, Manuscript

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# **1** Prevalence of Communication Disorders in primary School children in the Urban area of Dharwad

## **Abstract**

Being able to communicate and express verbally is one of the most important skills children learn during their childhood. When there is any impairment in communication, it can adversely affect <sup>28</sup> the development of speech and language abilities of the child. That may further result in the child falling behind both socially and academically. Early identification of such children is important for planning rehabilitation and prevention of further problems.

**1** The present study aimed to study the prevalence of communication disorders in school going children and to estimate the distribution across gender and grade in urban schools of Dharwad, North Karnataka. A total of 2241 children from Pre KG to 6th grade <sup>1</sup> were screened for communication disorders. The overall prevalence showed that around 10.3% of total children screened had communication disorders. Among them, language disorders (40%) were <sup>1</sup> found to be the highest followed by speech (29%) and hearing disorders (9%). Further, 5% of the children had multiple disorders. Across gender prevalence was more in boys (61.2%) than girls (38.7%). Further, grade wise distribution showed higher occurrence of communication disorders from UKG to Grade 3. <sup>3</sup> This information could be used to develop a database and <sup>3</sup> would help in better understanding the prevalence of communication disorders in children studying in urban locality of Dharwad.

# <sup>1</sup> Prevalence of Communication Disorders in primary School children in the Urban area of Dharwad

## Introduction

The capacity to communicate verbally is fundamental <sup>31</sup> to a child's development and wellbeing. Any impairment in communication can hinder a child's ability to learn effectively, to form a meaningful and supportive relationship and to influence others. If not identified or treated early, a child with communication disorder is susceptible to poor educational outcomes and increased likelihood of social, emotional and mental health issues. The spectrum of communication disorders include <sup>12</sup> speech and language disorders which could be due to underlying conditions such as intellectual disability, hearing impairment, autism, learning disabilities, Specific Language Impairment (SLI), voice disorders, fluency disorders <sup>18</sup> (American Speech-Language-Hearing Association, 2016).

Over the last few years, several epidemiological <sup>25</sup> studies have been conducted regarding the prevalence of communication disorders in Indian population. <sup>3</sup> Singh et al. (1980) reported that the prevalence of hearing impairment to be 7.3% in rural population of Lucknow district. Kumar et al. (2008) reported that prevalence of mental retardation to be 2.3% in Karnataka. National Sample Survey Organisation (2011) revealed that in India 19% of individuals have hearing impairment, 7% with speech impairment, 6% with mental retardation and 8% with multiple disabilities. <sup>2</sup> Sreeraj et al. (2013) conducted a survey in rural population of India and found out that the prevalence of individuals at risk of communication disorders was 6.07%. Sunderajan & Kanhere (2019) studied 1658 children in Maharashtra and reported that 2.53% children had <sup>3</sup> speech and language disorders. Devadiga et al. (2014) reported that among the individuals with

<sup>1</sup> speech, language and hearing impaired, prevalence of auditory disorders was 62% whereas <sup>1</sup> prevalence of language and speech disorders was reported to be 24% & 14% respectively. In their study paediatric population constituted 8.37 %. Further, it was reported that among the language disorders, receptive expressive language disorder (63.87%) were more prevalent and amongst <sup>12</sup> the speech disorders, articulation disorders (48.4%) were more prevalent in the pediatric group.

<sup>4</sup> There are a few studies that estimated the prevalence of communication disorders in school going children. Jayashree et al. (2015) screened 2010 school <sup>24</sup> children in the age range of 6-12 years for communication disorders. Children belonging to rural and urban regions of Mysuru were screened. Results indicated that the disorders that were more prevailed in school children include intellectual disability (10%), <sup>2</sup> specific language impairment (7.8%), multiple disorders (2.2%), and Autism Spectrum Disorders (0.9%). <sup>2</sup> Among the speech disorders, Articulation/ Phonological disorder were found to be more common (18.6%) compared to other speech disorders including Fluency disorders <sup>2</sup> (10.8%), Voice disorders (2.6%), Childhood dysarthria (1.7%) and Hypernasality with repaired cleft-lip & Palate (1.3%). Dey et al. (2017) studied 6707 patients in Faridkot, Punjab. <sup>10</sup> Approximately 43% of the total patients were reported with speech and language difficulties and all were aged below 10 years. Among them <sup>10</sup> included cases with idiopathic delayed speech and language, mental retardation, cerebral palsy, and hearing impairment. Kumar & Mello (2006) screened 6591 children in Hyderabad. <sup>6</sup> The results of the study showed the percentage of children identified at-risk for hearing loss was 15.96%, for speech and language problems it was 1.89 % and for other disabilities it was 0.76%.

<sup>4</sup> It is evident from the above literature that there are only a few studies done in India that investigated the prevalence of communication disorders in school children. Further, <sup>3</sup> there is a

dearth of published data in this regard in North Karnataka. Hence, the current study was conducted to see the prevalence of communication disorders among school children in the urban area of Dharwad and to estimate the distribution of communication disorders across gender and grades.

**Aim:**

To study prevalence of communication disorders in school going children in Dharwad, Karnataka and also to estimate the distribution of communication disorders across gender and grade.

**Method:**

**Participants**

A total of 2241 school going children from Pre KG to 6<sup>th</sup> grade were screened for communication disorders. Distribution of children across grades is given in table 1. Among the 2241 children, 1125 were boys and 1116 were girls. All the schools were situated in the urban region of Dharwad district, Karnataka.

*Table 1: Distribution of children across grades*

<b>Grade</b>	<b>Boys</b>	<b>Girls</b>	<b>Total no. of children</b>
Pre KG	70	89	159
LKG	138	140	278
UKG	176	162	338
I grade	200	192	392
II grade	152	164	316
III grade	158	164	322
IV grade	80	69	149
V grade	93	87	180
VI grade	58	49	107
<b>Total</b>	<b>1125</b>	<b>1116</b>	<b>2241</b>

### **Equipment and materials**

All the children had undergone speech, language and hearing screening using appropriate tools. Heine Mini 3000 F.O. Oscope was used for otoscopic examination. Pure-tone screening was carried out using ALPS AD 2000 diagnostic audiometers with telephonic TDH- 49 supra aural headphones. <sup>1</sup> **Test of Articulation in Kannada (Babu, Rathna, & Bettagiri, 1972; Deepa & Savithri, 2010)** and Stuttering severity Index (SSI) (Riley,1981) were used to evaluate to articulation and fluency respectively. GRBAS voice rating scale was used for subjective voice evaluation. Reading, writing and mathematics skills were assessed using respective grade's textbooks.

### **Procedure**

Entire screening procedure was <sup>2</sup> **carried out by experienced Speech-Language Pathologists and Audiologists.** Prior to screening, complete procedure was explained to the head of the schools and permission was obtained. All the procedures were carried out in a relatively



noise free room. Prior to pure-tone screening, normative thresholds were obtained on 5 normal hearing young adults. Every Child was instructed the procedures in simple ways.

Hearing screening was done after completing the otoscopic examination. <sup>1</sup> Pure tone screening was carried out <sup>2</sup> at 500 Hz, 1 kHz, 2 kHz and 4 kHz for air-conduction. Based on the normative data, children having <sup>2</sup> pure tone threshold higher than 25 dB HL at any one of the frequencies were referred. Further, those children with any significant condition in the otoscopic examination were also referred.

In order to check for voice, fluency, articulation and language, <sup>2</sup> children were screened informally through general conversation and/or story narration. Any child who failed in the screening was further tested to confirm the problem. Reading, writing and mathematics skills were informally screened. If required, respective class teacher was interviewed to get further information regarding child's academic performance.

The results obtained were analyzed, tabulated and <sup>13</sup> subjected to statistical analysis using SPSS 20 software. Descriptive statistics was done to study the prevalence and distribution of communication disorders across grades and gender.

## Results

<sup>1</sup> Results of the study revealed that among the 2241 children screened, 217 were found to have communication disorders. Hence, overall <sup>2</sup> prevalence of communication disorders in school children from the urban area of Dharwad was 10.3%. Among children with communication disorders, 86 children presented with language problems and 64 children had speech problems. Surprisingly only 19 children were found to have hearing disorders and multiple disorders were identified in 11 children. 37 children were detected with associated disorders such as ear wax,

tongue tie and ear discharge. Overall distribution of communication disorders is given in Figure

1. Communication disorders in each category is given in table 2.

**Figure 1: Overall distribution of communication disorders**

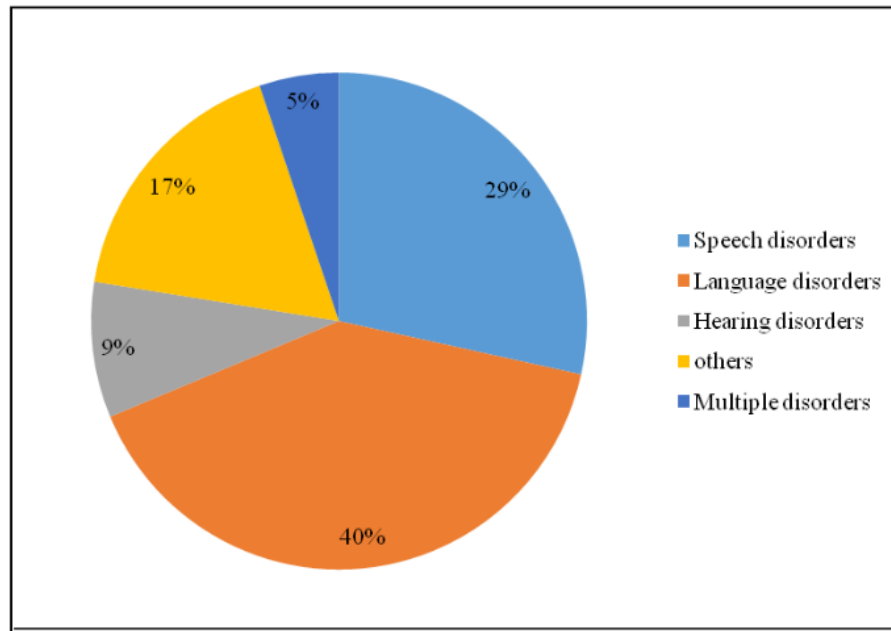
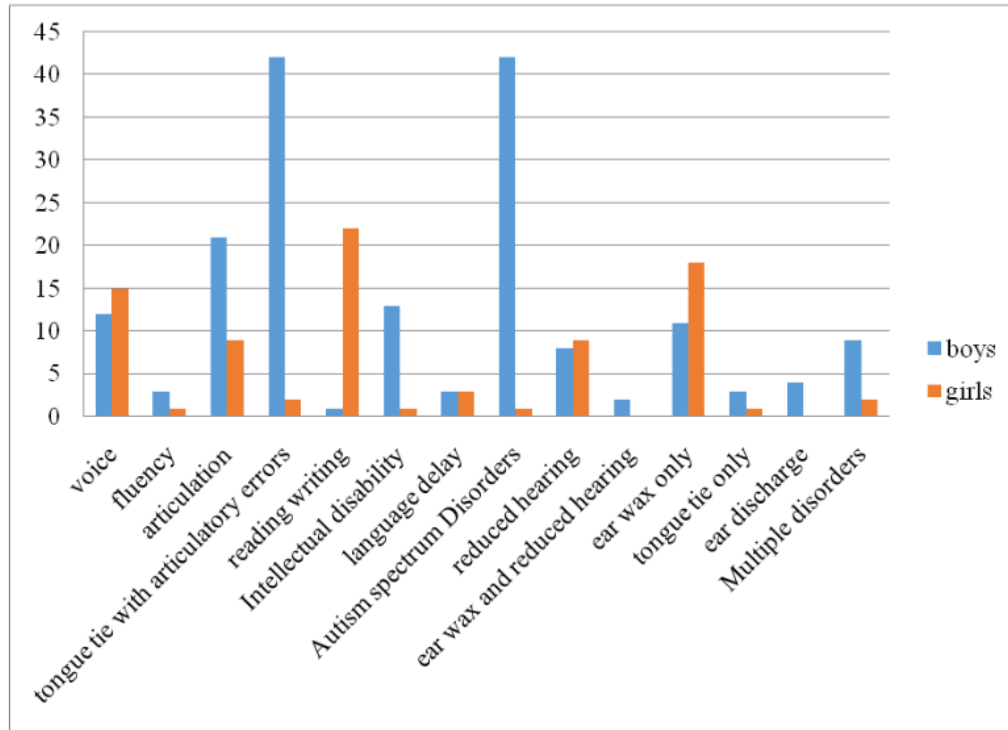


Table 2 depicts distribution of different types of communication disorders among 217 children. In speech disorders, Articulation/ Phonological disorders were found to be the highest (13.8%), followed by voice disorders (12.4%) and fluency disorders (1.8%). Among the language disorders, reading and writing errors was more common (29.5%) followed by language delay (16%), Autism spectrum disorders (1.8%) and Intellectual disability (0.9%) respectively. A total of 8.7% of school children had hearing loss, 13.4 % of children had ear wax whereas tongue tie and ear discharge was observed only in 1.8% of children respectively.

**Table 2: Distribution of <sup>2</sup> different types of communication disorders**

	<b>Disorders</b>	<b>Number of children</b>	<b>Percent (%)</b>
Speech Disorders	Articulation/phonological disorders	30	13.8
	Voice	27	12.4
	Fluency	4	1.8
	Tongue tie with articulatory errors	3	1.4
Language Disorders	Reading writing	64	29.5
	Language delay	16	7.4
	Autism spectrum Disorders	4	1.8
	Intellectual disability	2	0.9
Hearing Disorders	Reduced hearing sensitivity	17	7.8
	Reduced hearing sensitivity due to ear wax	2	0.9
Others	Ear wax only	29	13.4
	Tongue tie only	4	1.8
	Ear discharge	4	1.8
multiple disorders		11	5.1

**Figure 2: Distribution of communication disorders across gender**



Further, gender specific distribution showed that among 217 children with communication disorders, 133 were boys and 84 were girls indicating more prevalence in boys. It can be found in Figure 3 that articulatory errors secondary to tongue tie (31.6 %) and Autism spectrum Disorders (31.6 %) were common in boys compared to girls. In contrast, reading writing errors (26.2%) were common in girls.

**Table 3: Grade wise distribution of communication disorders**

Grade/ Disorders	Pre KG (N)	LKG (N)	UKG (N)	1 (N)	2 (N)	3 (N)	4 (N)	5 (N)
<b>Speech Disorder</b>	0	4	16	7	9	17	3	8
<b>Language Disorder</b>	9	7	8	14	14	17	7	11
<b>Hearing Disorders</b>	2	0	0	9	4	2	0	2
<b>Others</b>	2	0	18	8	4	2	1	1
<b>multiple disorders</b>	1	1	0	1	0	4	4	0
<b>Total</b>	<b>14</b>	<b>12</b>	<b>42</b>	<b>39</b>	<b>30</b>	<b>43</b>	<b>15</b>	<b>22</b>

\*(N)= Number of children

Grade wise distribution of communication disorders is given in table 3 and 4. Relatively, higher occurrence of communication disorders was seen from UKG to Grade 3 compared to other grades. Reading and writing errors were highly evident in these grades. Children exhibited difficulties in letter identification, confusions between upper case and lower case letters, illegible handwriting, Multiple spelling mistakes, poor phonological awareness and poor phoneme grapheme correspondence. Language delay (57.1) was predominant in Pre KG children. Articulation/phonological disorders (28.6%) and bilateral ear wax (40.5%) were relatively high in UKG children. Compared to all the other grades, Grade 1 had more cases of reduced hearing (17.9%). While voice disorders were common in grade 3 (18.6%) and grade 5 (27.3) children, multiple disorders were reported to be prevalent in grade 4 children (26.7 %).

**Table 4: Distribution of different types of communication disorders across grades**

Disorders	Pre KG	LKG	UKG	8	8	8	8	8
				Grade 1 (N)	Grade 2 (N)	Grade 3 (N)	Grade 4 (N)	Grade 5 (N)
voice	0	3	2	4	3	8	1	6
fluency	0			0	1	2	0	1
Articulation/ phonological disorders	0	1	12	3	4	7	2	1
tongue tie with articulatory errors	0	0	0	0	1	0	0	0
reading writing errors	0	5	4	12	10	17	6	10
Intellectual disability	0	0	0	0	0	0	1	1
language delay	8	1	3	2	2	0	0	0
Autism spectrum Disorders	1	1	1	0	1	0	0	0
reduced hearing	2	0	0	7	4	2	0	2
ear wax and reduced hearing	0	0	0	2	0	0	0	0
ear wax only	0	0	17	5	3	2	1	0
tongue tie only	1	0	1	2	0	0	0	0
ear discharge	1	0	0	1	1	0	0	1
Multiple conditions	1	1	0	1	0	4	4	0
	<b>14</b>	<b>12</b>	<b>42</b>	<b>39</b>	<b>30</b>	<b>43</b>	<b>15</b>	<b>22</b>

## <sup>1</sup> Discussion

The present study aimed at identifying the prevalence of communication disorders among school children in the urban area of Dharwad, Karnataka. The study also aimed to estimate the distribution of communication disorders across gender and grades. The overall prevalence showed that around 10.3% of total children screened had communication disorders. Among them, language disorders were found to be the highest followed by speech and hearing disorders. The results of the present study are in accordance to the reports of Shanbal, Arunraj & Reddy (2015) where 2010 school children were screened for communication disorders. They found that around 11.5% of children had communication disorders and prevalence of language disorders were higher compared to other conditions.

Our findings showed that 29.5% of total population with communication disorders had reading writing difficulties affecting their academic performances. Similarly, review of Indian literature reported significant number of school children having learning disability. Dhanda & Jagawath (2013) studied 1156 school children in the age range of 6-13 years in the rural area of Jaipur and reported 21.62% of children with dyslexia. The prevalence study on Learning Disability conducted at the L.T.M.G. Hospital, Mumbai (Hirisave, Oomen & Kapur, 2006) revealed that among the total number of 2,225 children visiting the hospital for certification of any kind of disability, 28.7% were diagnosed as having a Specific Learning Disability. Kuriyan & James (2018) reported 1-19% of school going children in India to have learning disability. There are varying reports regarding the prevalence of learning disability in India. Padhy et al (2016) who reported of 10%, Agarwal et al (1991) found 13%, Sridevi et al. (2015) reported 19%. These differences in prevalence could be due to geographical locations, different populations studied, socio economic status and screening procedures.

<sup>2</sup> The findings of the study revealed that number of children with hearing impairment are lesser compared to other studies carried out in other regions of Karnataka (Belgaum, 2014; Kondath S et al., 2013; Devadagi, Varghese & Bhat, 2014). The difference in findings could be probably due to different population being studied. In the current study, all the children belonged to urban areas where reduced number of hearing loss cases can be mainly attributed to healthcare accessibility, parental awareness, parental concern, standard of living Index and nutritional status of the children. (Rao, 2002 and Parvez et.al, 2016).

In our present study 13.4% children were present with bilateral impacted ear wax with no significant differences between genders. According to literature impacted ear wax is considered as one of the common otological problems in school going children that may or may not affect their hearing (Adegbiiji, 2014; Gabriel, 2015 & Akotey, 2017). Studies done by Rathnaraajan et.al (2019) in Pondicherry (Tamilnadu), Adhikari et al. (2008) in Katmandu (Nepal), Ulaganathan & Shalini, Tiruchirapalli (Tamilnadu) and Rao et.al (2002) in coastal areas of South India reports prevalence of Impacted wax to be 29.86%, 60.6%, 45% and 86.3% respectively in school children. <sup>9</sup> Impacted wax is mostly a silent condition and may not have been attended to by the caregivers of the children of school age. This was also because <sup>9</sup> the majority of such cases were asymptomatic and therefore medical care was not sought.

<sup>4</sup> The results of the present study indicated that the distribution of communication disorders <sup>27</sup> was found to be greater in boys when compared to girls. Western as well as Indian studies have also reported similar findings where ratio of boys were more with communication disorders compared to girls (Konadath et.al., 2017; Binu et.al.,2014; Etchell et.al., 2018; Mansson, 2000; Kogan et.al.,2018). Though the specific cause for gender difference is still under in investigation <sup>23</sup>



literature sheds light on certain aspects. Adani & Capanec (2019) argues <sup>5</sup> that the functional organization of the female brain gives women an inherent advantage in the acquisition of communication and language system over men. Lombardo (2012) ascribe to effects of sex hormones during fetal development for gender differences. <sup>5</sup> Various studies tried to establish the connection between testosterone levels in amniotic fluid and the anatomy of language-related brain areas, as well as functional communication and language skills (Lutchmaya, 2002; Knickmeyer & Baron-Cohen, 2006; Lombardo, 2012)

### Conclusion

<sup>1</sup> The present research aimed to study the prevalence of communication disorders in school going children in Dharwad, Karnataka and also to estimate the distribution of communication disorders across gender and grade. <sup>1</sup> The prevalence rate of communication disorders was 10.3%. <sup>4</sup> From the current study we can infer that among the communication disorders reported, prevalence rate of language disorders was highest followed by speech and hearing disorders. <sup>3</sup> This information could be used to develop a database and <sup>3</sup> would help in better understanding the prevalence of communication disorders in children studying in urban locality. <sup>7</sup> This throws light on the need for increased awareness regarding the language disorders in this region. Further the prevalence of children with reading writing difficulties indicates the need for creating awareness among parents and teachers to facilitate early identification of signs and symptoms leading to specific learning disability. Though children with speech disorders, hearing disorders and other disorders are reported less comparatively, the fact of presence of conditions cannot be ignored. <sup>20</sup> Early identification of such students can help in early institution of intervention and better improvement. <sup>4</sup> The present study is a preliminary attempt to establish region specific prevalence

rate. Further it is recommended to conduct prevalence studies in rural schools of Dharwad to compare the results across geographical areas. <sup>7</sup> Since the present study did not aim at finding the causative factors for the existing prevalence, further studies are recommended in that direction.

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*Table 1: Distribution of children across grades*

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VI grade	58	49	107
<b>Total</b>	<b>1125</b>	<b>1116</b>	<b>2241</b>



**Table 2: Distribution of <sup>2</sup> different types of communication disorders**

	<b>Disorders</b>	<b>Number of children</b>	<b>Percent (%)</b>
Speech Disorders	Articulation/phonological disorders	30	13.8
	Voice	27	12.4
	Fluency	4	1.8
	Tongue tie with articulatory errors	3	1.4
Language Disorders	Reading writing	64	29.5
	Language delay	16	7.4
	Autism spectrum Disorders	4	1.8
	Intellectual disability	2	0.9
Hearing Disorders	Reduced hearing sensitivity	17	7.8
	Reduced hearing sensitivity due to ear wax	2	0.9
Others	Ear wax only	29	13.4
	Tongue tie only	4	1.8
	Ear discharge	4	1.8
multiple disorders		11	5.1

**Table 3: Grade wise distribution of communication disorders**

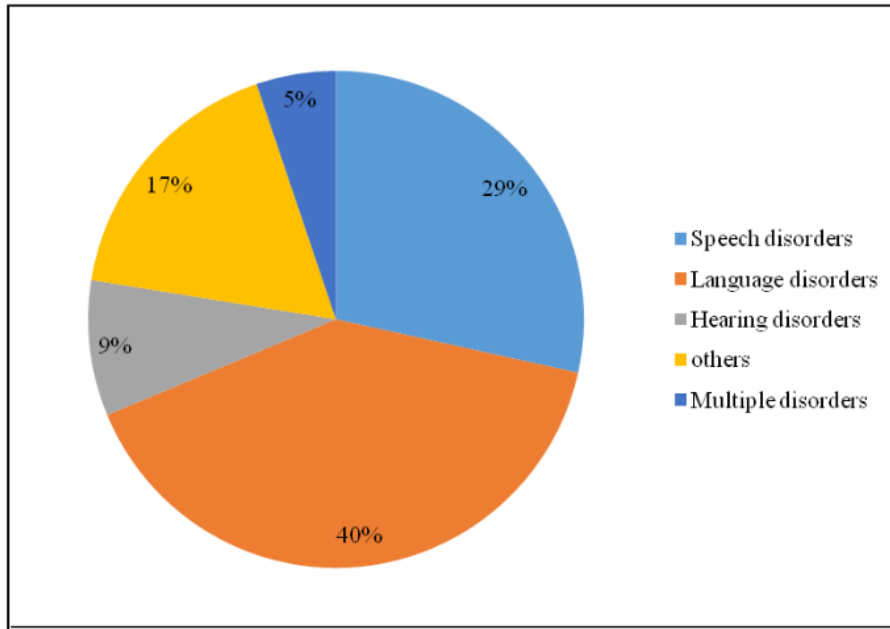
Grade/ Disorders	Pre KG (N)	LKG (N)	UKG (N)	1 (N)	2 (N)	3 (N)	4 (N)	5 (N)
<b>Speech Disorder</b>	0	4	16	7	9	17	3	8
<b>Language Disorder</b>	9	7	8	14	14	17	7	11
<b>Hearing Disorders</b>	2	0	0	9	4	2	0	2
<b>Others</b>	2	0	18	8	4	2	1	1
<b>multiple disorders</b>	1	1	0	1	0	4	4	0
<b>Total</b>	<b>14</b>	<b>12</b>	<b>42</b>	<b>39</b>	<b>30</b>	<b>43</b>	<b>15</b>	<b>22</b>

\*(N)= Number of children

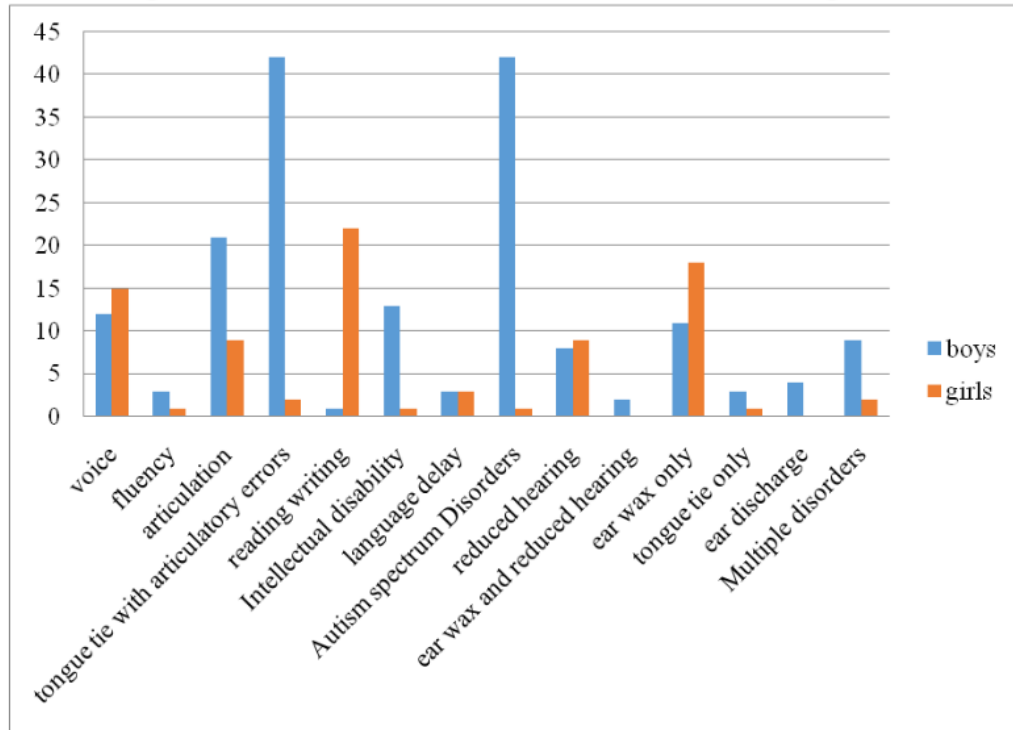
**Table 4: Distribution of different types of communication disorders across grades**

Disorders	Pre KG	LKG	UKG	8	8	8	8	8
				Grade 1 (N)	Grade 2 (N)	Grade 3 (N)	Grade 4 (N)	Grade 5 (N)
voice	0	3	2	4	3	8	1	6
fluency	0			0	1	2	0	1
Articulation/ phonological disorders	0	1	12	3	4	7	2	1
tongue tie with articulatory errors	0	0	0	0	1	0	0	0
reading writing errors	0	5	4	12	10	17	6	10
Intellectual disability	0	0	0	0	0	0	1	1
language delay	8	1	3	2	2	0	0	0
Autism spectrum Disorders	1	1	1	0	1	0	0	0
reduced hearing	2	0	0	7	4	2	0	2
ear wax and reduced hearing	0	0	0	2	0	0	0	0
ear wax only	0	0	17	5	3	2	1	0
tongue tie only	1	0	1	2	0	0	0	0
ear discharge	1	0	0	1	1	0	0	1
Multiple conditions	1	1	0	1	0	4	4	0
	<b>14</b>	<b>12</b>	<b>42</b>	<b>39</b>	<b>30</b>	<b>43</b>	<b>15</b>	<b>22</b>

**Figure 1: Overall distribution of communication disorders**



**Figure 2: Distribution of communication disorders across gender**



# Prevalence of Communication Disorders in primary School children in the Urban area of Dharwad

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