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Prevalence of Oromotor Impairment in Children with Speech, Language and Communication Disorder (SLCD)

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Abstract: ***The study aimed to estimate the prevalence of oromotor impairment in children with speech, language and communication disorders (SLCD). A retrospective analysis of 503 children aged 1–12 years was conducted to assess vegetative skills and oromotor impairments using SPSS. Results revealed a 45% prevalence of oromotor impairment, with drooling being the most common in children with cerebral palsy. The study underscores the importance of targeted interventions for oromotor deficits in SLCD. "***

Keywords: oromotor impairment, speech disorders, language disorders, communication impairments, vegetative skills.

1. Introduction

Oromotor impairment is a common condition in children with speech, language and communication disorders. Oromotor impairment leads to difficulties in vegetative skills along with speech production. This happens because of poor co - ordination of oral structure and impaired function.

An oral - motor skill refers to the movement of the muscles of the face (e. g., mouth, jaw, tongue and lips). This includes muscle tone, muscle strength, range of motion, speed, coordination, and dissociation (the ability to move oral structures, such as the tongue and lip, independently of each other). The acquisition and maturation of oral - motor movement underlies sound production and vegetative skills such as sucking, biting, chewing, swallowing, blowing, and drooling (Brodsky, 2002).

The term language impairment applies to a heterogenous group of developmental abnormalities may be result of accident, injury or other environmental factors and or may be delayed that are principally characterized by deficits and or immaturities in the use of spoken or written language for comprehension and or production purpose that may involve the form, content, and or function of language in any combination (Owen, 2008).

Most of the children with speech, language and communication disorders (SLCD) associated with developmental delay, cerebral palsy are reported in literature to present with oromotor impairments (Gokce, 2016).

Parkes et al (2010) reported that 21%, 22%and 22% of children with cerebral palsy had swallowing, chewing, and excessive drooling respectively. Reilly et al (1996) reported that 57% had sucking difficulties and 38% had swallowing difficulties in cerebral palsy children. Gokce (2016) reported that oral motor impairment will be present in 80% of developmental delay children and 90% of preschool children with cerebral palsy.

This study was taken up to find the prevalence of oromotor impairment in children with children with speech, language and communication disorder in Indian context.

The findings from this study provide essential insights into oromotor impairments in SLCD, helping develop targeted interventions for affected children.

Need for the study: There is limited number of studies about oromotor impairment in children with with speech language and communication disorder.

Aim of the study:

1) To estimate the prevalence of oromotor impairment in children with speech, language and communication disorder.
2) To evaluate the vegetative skills and oromotor structural and functional impairment in children within each SLCD.
3) To evaluate the various pre - natal, natal and post natal factors/ conditions associated with oromotor impairments.

2. Method

Retrospective study was carried out to evaluate the frequency of oromotor impairment in children with speech, language and communication impairments. Analysis of 503 individual case records of children with SLCD who reported to Institute of Speech and Hearing, Rajiv Gandhi Government General Hospital during 2018 to 2020 was taken. Males and female children in the age range of 1 - 12 years were considered for the study.

Children with Attention Deficit Hyperactive Disorder (ADHD), Autism spectrum disorder, cerebral palsy, delayed speech and language, expressive language disorder, global developmental delay and intellectual disability were included for the study. Children with hearing impairments were excluded.

Data regarding demographic data, medical history, pre - natal, peri natal and postnatal histories, developmental

histories, oral peripheral mechanism examination and vegetative skills, were retrieved and analysed. The oral peripheral mechanism examination is an important component of a complete assessment. The purpose is to identify or rule out structural and or functional factors that relate to a communicative disorder. Structure and functions of lips, teeth, tongue, hard palate, soft palate, uvula, pharynx, nose and jaw were assessed.

In structural examination of lips the following aspects were assessed whether lips were normal or cleft lip, repaired or unrepaired. If repaired, satisfactory or deviated or scarred. In functions the movements of lips were assessed, whether normal or abnormal, symmetrical or asymmetrical. For teeth: normal or missing or supernumerary or crossbite or overbite. For tongue: normal or microglossia or macroglossia or bifid - tongue or tongue tie or tongue thrust or spastic or atrophic. The movements of the tongue were normal or abnormal. Hard palate: normal or repaired or unrepaired or fistula or scarred. Soft palate: normal or repaired or unrepaired or fistula or scarred or short or submucous cleft. Uvula: normal or repaired or unrepaired or bifid or missing or short or elongated. Pharynx, nose and jaw: normal or abnormal

The vegetative skills like sucking, chewing, biting, swallowing drooling and blowing skills were assessed. All children with SLCD reported in the department were assessed by qualified speech language pathologist. Statistical analysis data were carried out using SPSS version 20. These data were analysed using chi - square test.

3. Results

Prevalence of vegetative skills deficits, oromotor structural and functional impairment in children with SLCD (Figure 1): Among 503 children with SLCD, vegetative skill deficit seen in ADHD is 38%, in autism spectrum disorder is 52%, in cerebral palsy is 69%, in delayed speech and language is 29%, in expressive language disorder is 29%, in global developmental delay is 34% and in intellectual disability is 33%.

Among 503 children with SLCD, oromotor structural impairment seen in autism spectrum disorder is 1 %, in cerebral palsy is 8%, in delayed speech and language is 6%, in expressive language disorder is 8%, in global developmental delay is 4% and in intellectual disability is 10%. No oromotor structural impairment seen in ADHD.

Among 503 children with SLCD, oromotor functional impairment seen in autism spectrum disorder and is cerebral palsy 1%, in delayed speech and language is 6%, in expressive language disorder is 5%, in global developmental delay is 4% and in intellectual disability is 7%. No oromotor functional impairment seen in ADHD.

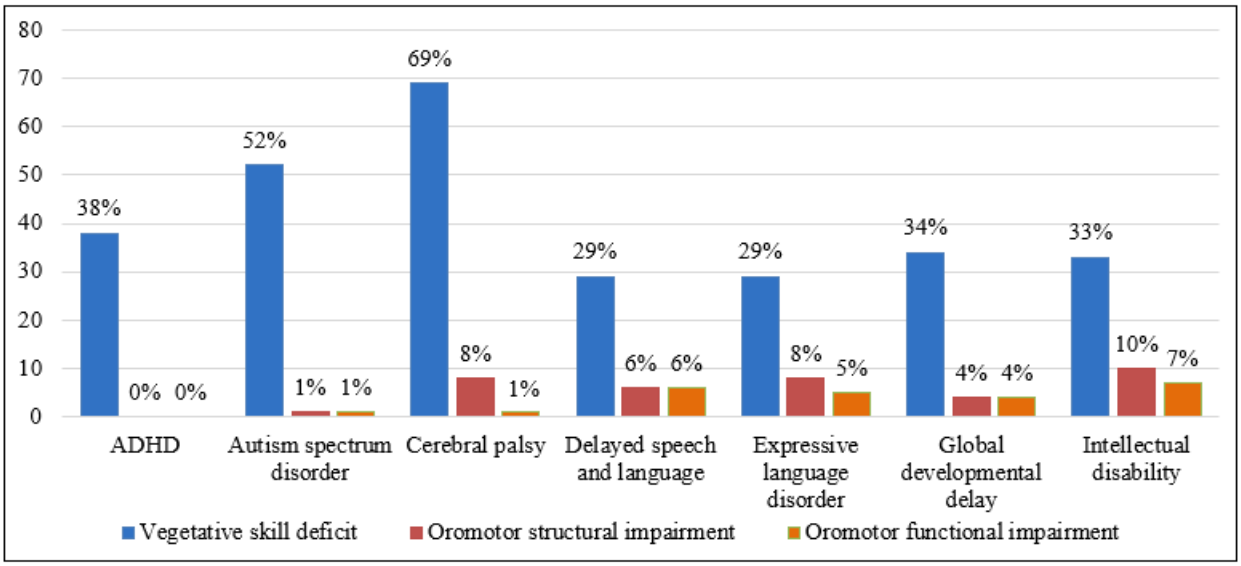

Figure 1: Prevalence of vegetative skills deficits, oromotor structural and functional impairment in children with SLCD

Prevalence of vegetative skill deficits in oromotor impairment children (Figure 2): Sucking deficit 1% and blowing deficit 10% in ADHD. Sucking deficit 14%, chewing deficit and biting deficit 5%, blowing deficit 27%, drooling 7% in autism spectrum disorder. Sucking deficit 11%, swallowing deficit 25%, blowing deficit 22%, drooling 45% in cerebral palsy. Sucking deficit 24%, chewing deficit and biting deficit 7%, blowing deficit 39%, drooling 15% in delayed speech and language. Sucking deficit 21%, chewing deficit 14%, blowing deficit 42%, drooling 7% in expressive language disorder. Sucking deficit 32%, chewing deficit 14%, biting deficit 8%, blowing deficit 41%, drooling 14% in global developmental delay. Sucking deficit 24%, blowing deficit 30%, drooling 14% in intellectual disability was observed in the present study.

Prevalence of vegetative skill deficits in oromotor impairment were observes as follows sucking deficit 18%, chewing deficit 5.7%, biting deficit 2.8%, swallowing deficit 2.5%, drooling 14.5% and blowing difficulties 30% in children with SLCD. Among all the vegetative skills, blowing difficulties had higher prevalence in children with SLCD.

Figure 2: Prevalence of vegetative skill deficits in oromotor impairment children

SLCD	Sucking	Chewing	Biting	Swallowing	Blowing	Drooling
ADHD	1%	0%	0%	0%	10%	0%
Autism spectrum disorder	14%	5%	5%	0%	27%	7%
Cerebral palsy	11%	0%	0%	25%	22%	45%
Delayed speech and language	24%	7%	7%	0%	39%	15%
Expressive language disorder	21%	14%	0%	0%	42%	7%
Global developmental delay	32%	14%	8%	0%	41%	14%
Intellectual disability	24%	0%	0%	0%	30%	14%

Prevalence of various medical conditions associated with oromotor impairment:

Various prenatal, natal, postnatal conditions were associated with oromotor impairments. Children whose mother had specific medication during pregnancy were associated with oromotor impairment has prevalence of 8%. Children who had admitted in NICU were associated with oromotor impairment has prevalence of 34%. Children with seizure were also associated with oromotor impairment with the prevalence of 24%. Children with postnatal medical conditions were associated with the prevalence of 34%.

Chi square test results various medical conditions associated with oromotor impairment (Figure 3):

The chi - square test showed a significant association between oromotor impairments and a history of specific medications during pregnancy X^2 (4, N =225) < 0.001, p < 0.05, with history of NICU admission X^2 (4, N =225) < 0.001, p < 0.05, with presence of seizures X^2 (4, N =225) < 0.001, p < 0.05, with post - natal medical conditions X^2 (4, N =225) < 0.001, p < 0.05.

(Figure 3): Chi square test results for various medical conditions associated with oromotor impairment.

Chi square test results (N=225)	X^2	df	P (<.005)
Specific medication during pregnancy	158.76	1	<.001
NICU admission	16.53	1	<.001
Seizures	45.33	1	<.001
Postnatal medical conditions	16.53	1	<.001

4. Discussion

The result indicates that children with SLCD had higher prevalence (45%) of oromotor impairment. These data contribute a clearer understanding of various medical condition were associated with oromotor impairment. Parkes et al (2010) studied 1357 children with cerebral palsy with the age range of 3 to 9 years had 21% of swallowing difficulties, 22% of chewing difficulties and 22% of excessive drooling. The present study analysed 13 children with cerebral palsy with the age range of 1 to 12 years showed 8% of swallowing difficulties, 15% of chewing difficulties and 69% of excessive drooling. In our present study, children with cerebral palsy had higher prevalence for excessive drooling than swallowing and chewing difficulties.

From present study, children from age range of 3 to 5 years and above 5 years had 29% and 30% of blowing difficulties. These results contribute a clearer understanding of children with SLCD have difficulties in vegetative skills.

5. Conclusion

The result showed that higher prevalence (45%) of oral motor impairment in SLCD. Various medical prenatal, natal and postnatal conditions were associated with oromotor impairment. Blowing is an advanced skill than first words or first phonemes. Blowing skills comes around two years of age and matures by three years of age (Marshalla, 2015). Among all the vegetative skills, blowing difficulties had higher prevalence of 30% in children with SLCD. The present study showed higher prevalence of drooling (69%) than swallowing (8%) and chewing difficulties (16%) in cerebral palsy children.

Parkes et al study showed 21% of swallowing difficulties, 22% of chewing difficulties and 22% of excessive drooling in cerebral palsy children. There are limited number of studies regarding oromotor impairment in children with Autism, ADHD, Intellectual disability, expressive language disorder, delayed speech and language and global developmental delay. Oromotor impairment is an important comorbidity in SLCD.

The study highlights a 45% prevalence of oromotor impairments in SLCD, with significant associations with prenatal, perinatal, and postnatal factors. Interventions targeting specific deficits like drooling and blowing difficulties are essential for improving outcomes in affected children.

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