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Knowledge, Awareness and Attitude about Speech-Language Pathologist among Dentist in Tamil Nadu

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Abstract

This study was conducted to assess the knowledge of speech-language pathology, terminologies and normal speech development, interdisciplinary approach and attitude towards referral to speech-language pathologists among dentists. A self- administered, web based questionnaire was circulated to Dentists registered in Indian Dental Association Tamil Nadu. 212 completed questionnaires were analyzed statistically with IBM SPSS version 20 software. The majority of the respondents had good knowledge of interdisciplinary approach for tongue-tie/ankyloglossia, cleft lip and palate. While the respondents were unaware that mandibular fractures, parafunctional habits, high arched palate, and open mouth resting posture required a referral to speech-language pathologists. The respondents had inadequate knowledge regarding speech-language pathologists and interdisciplinary approach. Due to this inadequate exposure and failure to recognize signs, communications disorders may go unnoticed in dental practice and lead to failure to early intervention.

Keywords: Speech- language pathology, interdisciplinary approach, speech and dentistry, speech language disorders.

Introduction

Communication is an essential part of human life, to deal with daily existence. Verbal communication is the most effective way of interaction between human beings.[1] The

real speech process can be complex. Different parts of an infant including their musculature, lungs, teeth, and mental/neurological ability co-ordinate to produce the actual speech. The American Hearing and Speech Association (ASHA) described communication disabilities as "an inability in receiving, transmitting, interpreting and recognizing concepts or auditory, nonverbal and graphic symbol systems" (ASHA, 2017). A communication disorder may be apparent in the form of hearing, language, and /or speech problems namely voice disorders, articulation disorders, phonological disorders, fluency disorders (stuttering & cluttering), resonance disorders, intellectual disability, and other problems.[2]

The World Health Organisation (WHO) estimates that 15% of the world's population is disabled and that hundreds of thousands of children are affected due to communication disabilities (WHO, 2017).[3] According to the Government of India's 2011 census, 2.2 percent of India's population had disabilities. The 2011 census classified hearing impairment of 18.9% as the second-largest disorder with speech impairment of 7.5% as the fifth-largest disability.[4] Shanbal JC & Raddy MS (2015) examined the prevalence of communication disorders in Mysore, Karnataka school-age children to be 11.5 percent. The prevalence of language impairment among them was elevated (7.4%), followed by speech disability (3.8%), and multiple disabilities (0.2%).[5] Speech and Language Disorders (SLD) are known to be a significant public health concern since they cause multiple problems from infancy to adulthood.

A speech-language pathologist (SLP) is described as the specialist who engages in the field of communication and swallowing during the life span of clinical practice.[6] SLP plays a vital role in service delivery in all aspects of communication and swallowing including speech production, fluency, language, cognition, voice, resonance, feeding, swallowing, and hearing(ASHA 2017).[2]

As per the American Dental Association (ADA), in addition to coordinating with other professionals in the team, the dentist is responsible for general teeth maintenance and diagnosis and management of oral and dental disease at all ages, including people with communication disorders (ADA, 2017).[7] Several studies indicated that a professional dentist should be characterized by a variety of features to successfully communicate with patients, such as empathy, motivation, management abilities, and communication skills, as well as strong listening and understanding of the patient's interest, especially that of children, as most of them are unable to articulate explicitly what they feel or respond to questions in connection to describing their pain or symptoms.[8] Because of lack of awareness most patients do not undergo early care. However, as the UN and UNESCO have implemented, it is understood that the earlier an infant seeks support care, the greater the child benefit.[9] According to the American Speech-Language-Hearing Association (ASHA), early speech and language intervention will mitigate expressive language and vocabulary issues. Regular communication plays a crucial role in achieving support and ensuring successful child care.[10] Pediatric dentists play a vital role in developing dentition as well as in the general growth of the infant by providing young children with appropriate communication establishment, as they are more aware of how the oral systems impact the speech.[11]

While coordination between the SLP and the dentist is significant, many dentists are less familiar with the task of the SLP in different fields which leads either to failure to recognize communication disorders or refer for intervention.[12] A research undertaken by Sultana R showed that medical students, including doctors and

dentists, have inadequate knowledge of the function and services that SLPs can offer in contrast with nurses and occupational and physical therapists.[13]

This cross-sectional study was undertaken to examine the dentist's knowledge of the role of the speech-language pathologist in Tamil Nadu. To date, little information on communication disorders skills and speech-language pathologists among dentists is available. Due to a lack of knowledge of communication disabilities and speech-language pathologists among dentists, the survey was performed to evaluate the effect on treatment/ referral.

Materials and Methods

A self-designed questionnaire was created based on the objective of research and literature review, known as knowledge, awareness, and attitude about speech-language pathologists among dentists. Part of this data was selected based on an adapted questionnaire from the Breadner et al (1987)- report on a general perception of speech-language pathologists[14] and Mahmoud HN et al 2019- Skills and attitudes of Jordanian dentists towards speech-language pathology.[15]

The questionnaire consisted of 4- parts. This first section A comprised 7(1-6) questions for collecting participant demographic information. This section includes age, gender, practice/employment status, qualification – bachelor/master's degree, specialization, work experience, and location of the practice. Part B consists of 2 categories. Category A consists of 5(7-11) questions to know about knowledge regarding speech-language pathologist professional expertise. Awareness of how they read about SLP, description of a speech-language pathologist, different age groups they address, where they are employed, and types of disease which they manage were included in this section. Category B is comprised of 5 (12-16) questions on awareness of terminology and the development of normal speech and language. In this section, terminologies, estimated age for /r/ sound development, and normal sentence development for a 3-year-old child were included. Part C consists of 6 (17-20) questions on awareness of communication disorders and the interdisciplinary approach between the speech-language pathologist and dentist, such as types of communication disorders that dentists have observed, examined, and handled in their practice, how SPL relates to dentistry and where interdisciplinary approach between dentist and SLP is required. Part D consists of 5(21- 26) questions regarding attitude and practice for referral such as whether patients with communication disorders are referred to SLP and other practitioners, and reasons not to refer to SLP.

The initial version of this survey featured 29 questions, and the average completion period was about 12 minutes. Four speech-language pathologists and four pediatric dentists reviewed the questionnaire. After getting their input the questionnaire was updated and rephrased. The final edition had 26 questions. The questionnaire was circulated among dentists practicing in Tamil Nadu via Google format, containing knowledge, attitudes, and practice about communication disorders and speech-language pathology among dentists. The convenience sampling method was used and data was collected at a single point of time. A statement has been added to the survey explaining that the participants will be anonymous and will stay confidential in their responses. The collection of the data was completed within a month (May 2020). The questionnaire was compiled and data were scored with the IBM SPSS version 20 program and analyzed statistically. Descriptive statistics were used to analyze the frequency of responses for categorical variables(N and %). Pearson chi-square has been used to define variations in response to the level of significance set at $p>0.05$ for various variables.

Results

A total of 219 dentists responded to the web-based survey. Based on the location of practice 212 Tamil Nadu dentists responded to the survey(n=212).

Part A. Demographic characteristics of the participants

The characteristics of respondents and their practices are shown in Table 1.

Table 1: Participant distribution according to the Demographic data

	N	Percentage
Gender		
Male	112	52.8
Female	100	47.2
Age		
23- 29 years	74	34.9
30- 39 years	72	34.0
40 – 49 years	60	28.3
50 -59 years	4	1.9
60 and above	2	0.9
Practice		
Private practice- self-employed	130	61.3
Private practice – corporate sector	30	14.2
University/institution attached	14	6.6
Government sector	24	11.3
Unemployed	14	6.6
Dentists		
General Dental Practitioner/ Bachelor Degree	106	50.0
– Speciality	8	3.8
Oral medicine & Radiologist	22	10.4
Oral maxillofacial surgeon	0	0
Conservative dentistry & Endodontist	12	5.7
Community dentistry	2	0.9
Prosthodontist	14	6.6
Periodontist	12	5.7
Pedodontist	8	3.8
Orthodontist		
Oral pathologist		
Experience		
Less than a year	26	12.3
1 year to 5 years	68	32.1
5 years to 10 years	34	16.0
10 years to 15 years	46	21.7
15 years and above	38	17.9

Part B. category A- Knowledge regarding speech-language pathology profession (Table II)

Results indicated that 29.2% (n=62)of the participants had never read anything about SLP. Among those who had read, 30%(n=64) of the participants, had read in their post-graduation and 16%(n=34) in under-graduation. Social media, child's parents, workplaces were ranked in the following order in other sources. In terms of who SLP was, half of the respondents ie 50%(n=10%) of the dentists believed that SLP works as a rehabilitation healthcare team, while 27.4%(n=58) and 22.6% (n=48) believed that SLP as a special educator and early interventionist/teacher respectively.

Relative to the places where SLPS were employed, 62.2% of the participants reported that SLP was employed in hospitals, 47.6 % in a private clinic, 22.6% in universities, 30.6% in schools, and 23.5% in kindergartens. While SLPs work in all of the settings mentioned, only 8 percent of respondents agreed that SLP worked in all settings.

With regards to the ages at which the SLP addresses, 47.2% of participants agreed that SLP interacted with infants, 84.9% with pre-school students, 69.8% with grade school children, 40.6% with teenagers, 32.1% with adults, and 27.4% with the elderly. Although SLP worked with all groups, only 20 % agreed that SLP worked with all age groups.

Dentists were asked to determine whether an SLP is involved or not in the treatment of various disorders (Table IV). Interestingly, more than 70 percent of dentists had good knowledge of disorder which requires SLP i.e- hearing loss, fluency disorder, autism, ADHD, and cleft lip and palate. Notably, the dentists cannot discriminate between those that do not need an SLP, for instance, people with pneumonia, people who lost their eyesight, people with leukemia, and people with muscle diseases.

TABLE 2

	N	Percentage
Have you ever read/ heard about Speech-Language pathologist before?	150	70.8
a. Yes	62	29.2
b. No		
If yes, where have you read about Speech-Language pathologist?		
a. In undergraduate	34	16.0
b. In postgraduation	64	30.2
c. Others – social media/child's parent/ workplace…. Mention source	52	24.5
d. Don't know	62	29.2
Who is a speech-language pathologist?	106	50.0
a. Rehabilitation healthcare team	58	27.4
b. Special educator	48	22.6
c. Early interventionist/teacher		
A speech-language pathologist works with…	100	47.2
a. Infants	180	84.9
b. Pre-school children	148	69.8
c. Grade school children	86	40.6
d. Teenagers	68	32.1
e. Adults	58	27.4
f. Elderly people		
Where do speech-language pathologists work?	50	23.5
a. Kindergarten	65	30.6
b. School	48	22.6
c. University	132	62.2
e. Hospital	101	47.6
f. Private clinic		
In which of these groups you might expect a speech-language pathologist to work with. (Select more than one)	78	36.8
	156	73.6
a. People with diseases or injuries of the brain	150	70.8
	156	73.6
b. People with hearing loss, auditory processing disorder	4	1.9
	122	57.5
c. People with fluency disorders eg. stuttering	110	51.9
	74	34.9
d. Autistic and Attention Deficient hyperactivity disorder children	36	17.0
	152	71.7
e. People with pneumonia	6	2.8

f.	People with voiced disorders	108	50.9
g.	People with mental retardation / intellectual disability	58 72	27.4 34.0
h.	People who have had strokes	42	19.8
i.	Adults who lose their eyesight	96	45.3
j.	People with cleft lip or palate	130	61.3
k.	People with leukemia		
l.	People with a swallowing disorder		
m.	People with dementia or memory deficit		
n.	People with muscle diseases		
o.	People with tonsillitis		
p.	People with cerebral palsy		
q.	People who start talking late		

Part B- category B- Knowledge regarding terminologies and normal speech development (Table 3)

This segment of the questionnaire covered terminologies and the normal development of speech. The pediatric dentist was well aware of terminologies and normal development of speech relative to a general dentist and other specialties and replied appropriately. Forty percent of the dentist replied correctly to all five questions. More than half of the respondent was ignorant of the word receptive and expressive language, i.e. 52.8 percent (n=112). A high percentage of respondents ie 75 percent (n=150) stated that children's estimated age for generating /r / sound is between 5 and 6 years. 90% (n=192) of the participants understood that children typically start generating two terms together in a sentence at the age of 2 and 3. 59.4%(126) of the respondent was not aware that phonological and articulation are different terminologies. Lastly, 85% of the respondent knew that the appearance of dysfluency was not considered normal in all ages.

Table III

	N	Percentage
Are you aware of the term receptive and expressive language? a. Yes b. No	100 112	47.2 52.8
The expected age for children to produce /r/ sound is between 5 and 6 years? a. True* b. False	150 62	70.8 29.2
Children usually begin to produce two words together in a sentence at the age of 2 and 3years? a. True* b. False	192 20	90.6 9.4
Are phonological and articulation disorder the same? a. Yes b. No*	86 126	40.6 59.4
Any dysfluencies including repetition and prolongation of sounds in the words eg. da, da, da dad will be considered normal in all ages. a. True b. False*	178 34	84.0 16.0

PART C- Knowledge interdisciplinary approach between the speech-language pathologist and dentist (Table 4)

90.6% (n=192) of the respondents accepted that SLP and dentists are interrelated due to the stomatognathic system/rehabilitation of oral structures. Dentists had a deep understanding and had encountered articulation disorder/lisps, fluency disorder, and language delay in their practice with a rate of 60.4%, 50.9 %, and 40.1 %,

respectively, while 16 percent of respondents had never encountered speech disabilities in their profession.

79 percent of the dentist agreed that evaluating tongue function is important for diagnosing speech disorders to assess speech disorders. 46.7 percent of respondents included jaw movements, 38.5 percent facial muscles, 21 percent lip movement, 30.5 percent spontaneous mime and integrated movement, and 27.6 percent counting no 1 to 20, picture name test, oral diadochokinetic test, picture name test, nasal emission test, speech clarity, and nasal/oral articulation resonance, while 11.4 percent of dentists did not know what to include in speech assessment.

The questions addressed participants where an interdisciplinary approach is needed between dentists and SLP. For tongue-tie/ankyloglossia and cleft lip and palate, most dentists had good knowledge of the interdisciplinary approach. Just 60% of dentists were aware of the need for an interdisciplinary approach to swallowing disorder. Half of the participants claimed that tongue thrusting, oral rehabilitation with new dentures and dental implants, and oral myofunctional disorders warranted an interdisciplinary approach. Nearly 25% of the participants were unaware that mandibular fractures require referral to a speech-language pathologist.

TABLE 4

	N	Percentage
Do you think speech-language pathologist and dentist are inter-related due to stomatognathic system/ rehabilitation of oral structures/orofacial myology		
a. Yes	192	90.6
b. No	20	9.4
What type of speech and language disorder you know and / have encountered in your practice? (you may select more than one)	128	60.4
a. Articulation disorder/lisps	108	50.9
b. Fluency disorder	70	33.0
c. Resonance disorder	62	29.2
d. Receptive and expressive language disorder	80	37.7
	102	48.1
e. Dysphagia/swallowing/ oral feeding disorder	34	16.0
f. Language delay		
g. None		
What do you normally include in the evaluation of speech disorder?	166	79.0
a. Tongue function	98	46.7
b. Jaw movements	44	21.0
c. Lip movements	80	38.1
d. Facial muscles	64	30.5
e. Spontaneous mime and integrated movements (blowing, sucking, whistling)	58	27.6
f. Counting no 1 to 20, Picture naming test, oral diadochokinetic testing, nasal emission test, clarity of speech, nasal /oral resonance for articulation	24	11.4
g. Don’t know		
For what kind of these conditions, do you think an interdisciplinary approach is required between speech-language pathologists and dentist? (select more than one option)	164	78.1
	176	83.8
a. Ankyloglossia/tongue-tie	48	22.9
b. Cleft lip and palate	91	43.3
c. Mandibular fracture	126	60.0

d. Temporomandibular joint disorder	110	52.4
	108	51.4
e. Swallowing disorder, persistent	98	46.7
infantile swallow	50	23.8
f. Oral rehabilitation with the new	90	42.9
denture and dental implants	72	34.3
g. Tongue thrusting	64	30.5
h. Mouth breathing	62	29.5
i. Enlarged tonsils	68	32.4
j. Malocclusions- open bite,	114	54.3
crossbite		
k. Missing teeth, premature tooth		
loss		
l. High arched palate		
m. Thumb sucking		
n. Open mouth resting posture		
o. Orofacial myofunctional		
disorders		

PART D- Attitude and practice regarding referral (Table 5)

The majority of the dentist(91.9%) believed that speech evaluation should be included as part of the dental examination. 90% of the participants referred the patient with speech disorder/communication disorders to other practitioners. As far as referral to health care provider/specialty is concerned, 63.8 % of the participants referred to SLP, while 51. 4% referred to the pediatric dentists and 43.8% to the pediatrician. Concerning the reason for referral (based on symptoms), 76% of the participants referred to SLP due to stuttering/stammering. The respondents had many different reasons for not referring the patient with speech disorders to SLP; approximately 39.8% of the dentist had a lack of knowledge about speech-language pathologists, while 25% of the respondents were uncertain of the diagnosis. After this survey, 95.3% of the dentists were ready to refer their patients with speech/ communication disorder to SLP.

TABLE 5

	N	Percentage
Do you think speech evaluation should be done as a part of a dental examination in children	195	91.9
a. Yes	17	8.1
b. No		
Do you refer patients with speech disorders to other practitioners?	192	90.6
a. Yes	20	9.4
b. No		
Which health care provider/specialty do you refer to specifically? (You may select more than one option).	92	43.8
a. Pediatrician	108	51.4
b. Pedodontist	134	63.8
c. Speech-language pathologist	0	0
d. Social worker	22	10.5
e. Psychologist	8	3.8
f. Others		
If you had referred the patient to a speech-language pathologist, what would be the reason for referral(symptoms)? (select more than one option)	98	47.1
	158	76.0
	112	53.8
a. Hypernasality	142	68.3
b. Stuttering/Stammering	52	
c. Misarticulation		
d. Reduced speech intelligibility		
e. Swallowing difficulty		
If you have never referred a patient with speech disorder to a speech-		

language pathologist, what is/are the reasons?	14	6.8
a. Parents may become angry if I refer them to a speech-language pathologist	82	39.8
b. Lack of knowledge about the speech-language pathologist	38	18.4
c. Lack of knowledge of referral procedures	52	25.2
d. Uncertainty about diagnosis	2	1.0
e. Lack of time	22	10.7
f. None of my patients need a referral to a speech-language pathologist	56	27.2
g. No reason was given		
After participating in this survey, are you more likely to refer a patient with speech /communication disorder to a speech-language pathologist, when needed?	202	95.3
a. Yes	10	4.7
b. No		

Discussion

This cross-sectional study was conducted to investigate the role of speech-language pathologists among dentists in Tamil Nadu. There is a scarcity of published research on the expertise of dentists about SLP as well as an interdisciplinary approach. There has been no research conducted at Tamil Nadu to the best of our knowledge.

Speech and Language Therapy is a diagnostic as well as a therapeutic intervention that offers prevention, curative, and rehabilitative care of human communication difficulties including speech, vocabulary, voice, and swallowing disabilities.[16,17] Half of the respondents, i.e., 50% of the dentist acknowledged that SLP is a member of the rehabilitative healthcare team worker. District Early Intervention Centre under Rashtriya Bal Swasthya Karyakram(RBSK) was introduced by the Ministry of Health and Family Welfare, Government of India. It operates with the aim of early detection and intervention of 4D's with a multidisciplinary team through an interdisciplinary approach. For the interdisciplinary approach following professionals has been employed in this multidisciplinary team - pediatrician, medical officer, dentist, early interventionist, speech therapist, audiologist, optometrist, laboratory technician, and dental technician.[18]

In India, considering the tremendous demand for SLP, many health care practitioners lack adequate awareness and collaborative services. The American Speech-Language-Hearing Association (ASHA) reports that speech-language specialists work in a wide range of sectors, including schools, hospitals, private residences, nursing homes, etc. (ASHA, 2017). SLPs often work in institutional facilities such as hospitals or nursing homes.[2] Because of this diverse job environment, SLPs come into contact with professionals from various fields.[13] Most of the dentist claimed in the present study that SLPs were employed in hospitals and private practice, followed by school, kindergarten, and university. Only 8 percent of the respondent accepted that SLP served in all five locations. The findings were consistent with a previous study conducted by Mahmoud HN et al in 2019 in which dentists assumed that private clinics were the initial establishments that employed SLPs, with only 12 percent of dentists felt SLPs were operating in all five locations.[15]

The SLP also deals with all age groups from infants to the elderly.[16] The result showed that significant percentages of dentists believed that SLP works with pre-school children and grade school children while the lowest proportion was reported for the elderly and the adults.

Interestingly, the respondent accepted that SLP operated for all ages ranges just 17 percent. There was a notable difference between this study and previous studies conducted by Mahmoud HN et al 2019, where a high percentage was recorded for school children and infants, with a low percentage for infants and elderly.[15] Although the American Academy of Pediatric Dentistry and the American Dental Association[19] have recommended that "a child should visit the dentist within 6 months of the eruption of the first primary tooth and no later than 12 months of age" but the majority of the children reported for their first dental visit in India were in the age group of 4–10 years due to pain and dental caries. This might be the possible explanation for inadequate awareness of dentists regarding children below the age of 4.[23] Dentists were also unaware of the role of SLP in the case of adults and elderly people, such as those who have speech, neurological, or swallowing impairments after disease, trauma, or illness.[20]

Concerning disorders that SLPs deal with, the majority of dentists recognized certain conditions such as hearing loss, fluency conditions, autism, ADHD, swallowing disorders, intellectual disability, cleft lip and palate, and language delay, but some did not. This may be a significant finding as it has enhanced the likelihood that other neurological disorders such as stroke, dementia, and brain injuries leading to communication problems might remain unrecognized and thus untreated. The result showed higher values than the previous studies in Amman (Mahmoud et al 2014) [21] and in London (Breadner et al 1987) [14] on the general public. Therefore, due to limited exposure to speech-language pathology, there is a big gap between dental professions and SLPs.

In the present study, the majority of the respondents had a good knowledge regarding terminology and normal speech development which is in contrast to the study conducted by Mahmoud HN et al 2019.[15] In the present study, pediatric dentist(n=14) were well aware of terminology and speech development compared to general dental practitioners. Interestingly, 50% of the dentist answered all the five questions correctly. This is in contrast to the study conducted by Eyndhoven et al 2015 on general knowledge of pediatric dentists about SLP, in which less than 1% of the respondent answered all questions on normal speech and language development issues or speech and language impairment symptoms.[22] Even though normal milestones are mentioned in the American Academy of Pediatric Dentists' Handbook, general dentist are still unaware of these milestones. [19]

For having the stomatognathic system as a common area of work, the speech pathologist and dentist need to be aware of each professional's field of expertise, for a treatment that supports the other and achieves better clinical outcomes together.[23] In the present study 90.6% of the dentist believed that SLP and dentists are interrelated due to the common field of work-stomatognathic system/orofacial myology. This is consistent with the study conducted by Amaral EC et al 2006 in which ninety-five percent of Facial Orthopedics and 100 percent of dentists agree that the better outcomes of the Speech and specialty collaboration originate from interaction with the area of orofacial myology.[24]

According to ASHA, "Speech sound impairments may arise from problems with articulation (making sounds) and phonological processes (sound patterns). A language disorder is characterized by deficiencies in comprehension (understanding) and/or production (use) of spoken and written language." Speech disorders include disorders of articulation, fluency, resonance, or voice and dysphagia/ oral feeding disorders whereas language disorder includes receptive and expressive disorders.[17] Concerning speech disorders, 60.4% of the dentists have encountered

articulation disorders/lisps followed by fluency disorder and language delay. In their experience, 16 percent did not witness any of these speech disabilities in their practice.

ASHA has stated that for assessment of orofacial complex in oral myofunctional disorders, particular attention should be given to "symmetry of movement of oral structures (lips, jaw, tongue, velum), abnormalities of the tongue, size of tonsillar tissue concerning airway, the configuration of the hard and soft palates, the status of the dentition, including occlusion, tactile sensitivity outside and inside the mouth." Screening of individual sounds in a single word and connected speech, malocclusion, diadochokinetic Tasks, oral resting posture, swallowing pattern, strength, and range of motion of musculature is also included for assessment of orofacial complex.[25] Oro-myofunctional behavior can also be examined using the Lembrechts et al protocol- in which evaluation of the tongue function (tongue position at rest, tongue protrusion, tongue retraction, tongue lifting against the upper lip, tongue lifting against the lower lip, lateral movements of the tongue, click one's tongue), jaw movement (lateral movement of the jaw, jaw opening), lip movement (lip position at rest, lip closure, dispersion of the corners of the mouth, lip protrusion, lip strength), facial muscles, spontaneous mime and integrated movements (blowing, sucking, whistling) are included.[2] In the current study, more than ¾th of the participants included tongue function for evaluation of speech in their practice. Though it has been published by the American dental association 1977, for the screening of speech in the dental office, the dentists should include 1) assessment of speech sound production – a sampling of child's pronunciations in counting activities, word responses to pictures or questions and conversational speech situation, and 2) estimating neuromotor status for speech with oral diadochokinetic testing. Still, in the present study, 11.4% of the dentist was unaware of what to include for evaluation of speech.[27]

In the rehabilitation of oral structures, an interdisciplinary approach is needed between dentists and SLP along with physicians, physiotherapists, and psychologists.[23] The first specialties to interact with speech therapists are pediatric dentists and orthodontists to identify tongue tie/ankyloglossia, cleft lip, and palate, malocclusion, guidance on breastfeeding, oral habits including mouth breathing, tongue thrusting, and thumb sucking.[28] The other specialist to interact with speech-language pathologists are oral –maxillofacial surgeon for mandibular fracture, temporomandibular disorders, and patient undergoing orthognathic surgery.[23] Other conditions that require an interdisciplinary approach are rehabilitation with new dentures and dental implants,[26] high arched palate,[29] swallowing disorders, open resting mouth posture, and orofacial myofunctional disorders.[25] Even transient speech abnormalities caused due to premature loss of incisors requires the collaboration of dentist and SLP.[30] Most dentists had good knowledge of the interdisciplinary approach to tongue-tie/ankyloglossia and cleft lip and palate. Half of the participants believed an interdisciplinary approach was required for tongue thrusting, rehabilitation with new dentures and dental implants, and orofacial myofunctional disorders. Most of the participants were unaware that mandibular fractures, thumb sucking, high arched palate, and open mouth resting posture require referral to a speech-language pathologist. Thus inadequate exposure of the dentist to these disorders, makes the speech-language disorders go unnoticed in the dental office and may lead to failure of adequate management.

An unexpected result of the current investigation was that only 30% acquired their information about SLP from the post-graduation university curriculum and 16% from

under graduation. This is a very low percentage, which suggests a lack of adequate information conveyed in academic programs, which raises the importance of effective education with special courses related to normal speech development, speech disorders, and screening in the dental office. On the contrary, 24.5% acquired their information from the workplace, social media, and child's parent in the following order. The result showed that the initial and most vital resource of information is work experience. Clear description for this is that dentists interact directly with patients in the clinic and this kind of communication opens up the opportunity to discuss the information at the workplace with others and seek the appropriate professional.[15]

In the present study, 63.8% of the dentist referred their patients to SLP. Nearly 40-50% of the referral was to a pediatric dentist and pediatrician. The main reason for not referring to the SLP was lack of knowledge about SPL, uncertainty about the diagnosis, no reason given, and lack of knowledge about referral procedures. A pediatric dentist may be the first person consulted for professional advice concerning children with speech problems.[31] Speech screening involves less than 5 min in the dental office and can be done by general dental practitioners.[27] In the current study, more than 90% of the dentist agreed that speech screening should be included as a part of the dental examination for children. This is consistent with the study conducted by Eyndhoven et al 2015 on general knowledge of pediatric dentists about SLP, in which the majority of pediatric dentists accepted that speech evaluation should be part of the dental review.[22]

Due to a lack of recognizable signs, communication disorder frequently goes unnoticed or is not given priority, especially in children. In school-going infants, the lack of recognition of these communication disorders can affect their academic performance, including cognition, emotional behavior, social interactions, involvement, and integration.[1] It is necessary to categorize children at risk, refer them for detailed assessment, and rehabilitate them as early as possible.

Conclusion

To conclude, the dentists had insufficient knowledge about SLP and the interdisciplinary approach. The importance of early identification and intervention has been well established in pediatric cases with speech and language disorders. A dentist needs to be aware of the knowledge and attitude of SLP on early identification and intervention.

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