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Assessment and Treatment Therapies of Stammering used by Speech-Language Pathologists; A cross sectional study

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Abstract:

Objectives: The objective of the present study was to find out the assessment and treatment practices of stammering among Speech-Language Pathologists in Lahore.

Methods: It is a retrospective cross-sectional study involving 10 cases who suffered from oversleeping, loss of appetite. Data was collected from 207 speech-language therapists working in clinics, tertiary care hospitals, and special education settings in Lahore. A self-structured questionnaire consisted of different statements regarding assessment and treatment practices of stammering. Data was statistically analyzed in SPSS. Descriptive statistics were used for demographic information while the chi-square test was used for comparison between assessment & treatment practices of stammering and their qualification

Results: Results indicated that speech-language therapists were using observations and recordings of the clients' speech during different social settings. Formal and informal assessment of secondary behaviors caused fear of speech as assessment protocols for stammering while fluency shaping and use of reduction in oral vocal muscular tension at the time of speech as treatment methods for stammering.

Conclusion: It was concluded that observation of a client's speech and fluency shaping are assessment and treatment methods used by speech-language therapists and these played a very important role in the management of stammering among individuals who stammer.

Keywords: Stammering, Assessment, Treatment, Speech-language therapist, Speech easy, Lidcombe program, Computer-assisted devices

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Introduction

Estimates depict that 1% of the total adult population has stammering(Stoeckle, 2016). Stammering is a neurological disorder that hinders normal fluent speech production. Signs of stammering vary from person to person but in general, these are specific difficulties of the word- and sound, prolonged sounds, and perceptible physical tension the speaker struggle to articulate his words. There is a great need for and importance of evidence-based practices in the field of speech-language pathology. Speech therapists should select those treatment approaches that are based on literature and must document the results of their intervention, particularly for fluency disorders ("Evidence-Based Practice (EBP)," 2015).

The assessment of stammering has different perspectives. According to some learning theorists, there are no primary covert problems for stammering among individuals but secondary behaviors that mainly cause stammering, and these overt behaviors are prolongations, repetitions, and blockages. The first step in assessment is the referral and appointment, after that, informal observations are made, and formal assessment is done including frequency count and severity evaluation by a process

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called Lidcombe behavioral data of language stammering. Other assessments may include attitudes, perceptions about the problem, and behavioral issues (G.Menzies Mark Onslow Ann Packman SueO'Brian, 2014).

(Yaruss, 2014) researched implications for assessment and treatment of stammering and predicted a comprehensive set of assessment features for fluency. They concluded that areas like speech efficiency, severity, and frequency of disfluencies, tension, and effort in communication during the fluent and dysfluent speech, the speaker's ability to communicate in various situations (social or home settings), speaker's emotional responses towards stammering (fear, frustration, and anxiety), and self-perception of the speaker must be considered at the time assessment of stammering by speech-language pathologists.

In the current study assessment strategies were used in the questionnaire like observing the client's speech during an interview, tape recordings of the client's conversations in multiple settings, client's speech while performing any specific speech task, to check the extent and category of stammering, assessing the secondary behaviors related to stammering, measurement of speech syllable per min, observing and recording physiological measurements of oral, laryngeal, and respiratory behavior for assessing the capacity for fluent speech production, interviewing the client or client family about social circumstances, determining coexisting problems such as language, voice, articulation, psych emotional or cognitive level.

The treatment strategies like the Lidcombe program, speech essay, delayed auditory feedback, fluency shaping, computer-assisted devices, reduction of speech associated anxiety, reduction of oral motor tension during the speech, and helping the client to be dysfluent in normal ay were used as questionnaire tool. Fluency shaping involves the activation of areas that help the stammer to monitor his or her speech, one of its examples is delayed auditory feedback (Andrade*, Sassi**, Juste***, & Ercolin**, 2015). The extension of the time between listening and speaking perception trains the patient to communicate effortlessly by playing the recorded voice of the patient. In Delayed Auditory Feedback, the persons hear their voice with a slight delay, generally about one-tenth of a second later (Bahadorinejad A, 2012)

One of the major domains of psychoanalysis is cognitive behavior therapy. The main focus of this is on the understanding of cognitive roles and individual's role in cognitive achievement and behavioral change. This therapy is used with those adults who experience a high level of fear and social anxiety linked with stammering and communicating(Itzin, 2018).

In a study, it was reported that 50% of adults with stammering face a significant level of social anxiety. The role of The social escape, the unease of individuals who stammer, and improvement in the quality of life of such persons can be increased by taking sessions of cognitive behavior therapy(Gupta, Yashodharakumar, & Vasudha, 2016).

A cross-sectional study was conducted on relations between individual characteristics for stuttering and psychological well-being and the findings of this research indicated that there are significant influences of a higher level of self-control on the management of stammering(Boyle, 2016).

A pretest-posttest study was conducted in 2008 on nineteen adults with stuttering who took part in a successful stuttering management program(SSMP) and according to this the SSMP has strong treatment value in reducing anxiety and stress-related symptoms of stuttering but is ineffective in improving stammering behaviors and secondary behaviors that cause stammering(Blomgren, Roy, Callister, & Merrill, 2005). The aims and objectives of this study are to find out the assessment and treatment practices of stammering among Speech-Language Pathologists in Lahore, Pakistan.

Methodology

Study design, setting, and participants:

This descriptive-analytical cross-sectional study was conducted in 2019 in Lahore Pakistan through speech-language therapists who have done BS, MS, and diploma in speech-language pathology with more than 1 year of experience, working in various clinics, and tertiary care hospitals and special education settings in Lahore Pakistan.

A structured questionnaire was developed after an extensive literature review and expert opinion for the collection of data. The validity and reliability of the questionnaire were calculated by using Cronbach alpha. The questionnaire consisted of 30 items divided into three domains; demographic information, assessment methods, and treatment methods.

Data collection and Procedure:

A structured questionnaire was developed for the collection of data. The study included speech-language therapists who have done BS, MS, and diploma in speech-language pathology with more than 1 year of experience, working in various clinics, tertiary care hospitals, and special education settings in Lahore. A convenient sampling technique was used and the sample size was calculated based on the total population (450) of speech-language pathologists (Khan et al., 2019), using a 95% level of confidence and 5% confidence interval (CI) through an online calculator.

Statistical Analysis:

The statistical analysis was ordered into descriptive and inferential statistics. The data was statistically analyzed by application of descriptive statistics through SPSS 2.1 version. A cross-sectional survey was done to gather data. To analyze data correlation analysis was applied to find relatedness between qualification and assessment and treatment practices used by speech-language pathologists. Descriptive: Mean ±SD, n (%) Inferential statistics: Chi-Square Test, ANOVA, Tukey HSD for Multi comparison.

Results

Table 1. Demographic Characteristics of Participants

Variables	Categories / Unit	N (%)
Age of participants, Mean ±SD	Years	27.56± 4.18
Gender	Male	21 (10.10)
	Female	186 (89.90)
Qualification	Diploma	52 (25.10)
	BS	62 (30.00)
	MS	93 (44.90)
Setting of Work	special education school	94 (45.40)
	private practice	60 (29.00)
	university clinic	17 (8.20)
	hospital/medical setting	36 (17.40)
Experience (Years)	< 2	65 (31.40)
	2-5	90 (43.50)
	6-12	40 (19.30)
	13-15	7(3.40)
	16-20	4(1.90)
	>20	1(0.50)
Therapies used for stammering	Lidcombe	1(0.50)
	speech essay	30 (14.50)
	delayed auditory feedback	3(1.40)
	fluency shaping	54 (26.10)
	All of them	109 (52.70)
	Others	10 (4.80)
Outcome of effective treatment	The client becomes more fluent	138 (66.70)
	The client accepted being dysfluent	55 (26.60)
	There was no change in the client's fluency	14 (6.80)
Total		**207 (100)**

Table 2. Assessment and analysis of questionnaire-based survey

Assessment		Qualification			Total	Chi-Square	P-Value
		Diploma	BS	MS			
Observation during an interview	strongly agree	27(51.90)	24(38.70)	59(63.40)	110(53.10)	9.18	0.01*
	agree	25(48.10)	38(61.30)	34(36.60)	97(46.90)		
Tape recordings of daily activities	strongly agree	25(48.10)	25(40.30)	42(45.20)	92(44.40)	2.57	0.632
	agree	27(51.90)	36(58.10)	48(51.60)	111(53.60)		
	Do not know	0(0)	1(1.60)	3(3.20)	4(1.90)		
Observation of client speech while performing specific task	strongly agree	32(61.50)	26(41.90)	46(49.50)	104(50.20)	10.35	0.035*
	agree	18(34.60)	30(48.40)	46(49.50)	94(45.40)		
	Do not know	2(3.80)	6(9.70)	1(1.10)	9(4.30)		
Recordings of client's speech while performing specific task	strongly agree	23(44.20)	19(30.60)	29(31.20)	71(34.30)	7.01	0.32
	agree	24(46.20)	37(59.70)	59(63.40)	120(58.00)		
	Do not know	5(9.60)	6(9.70)	4(4.30)	15(7.20)		
	strongly disagree	0(0)	0(0)	1(1.10)	1(0.50)		
Systematic protocols help to check category of dysfluency	strongly agree	18(34.60)	21(33.90)	40(43.00)	79(38.20)	10.06	0.122
	agree	23(44.20)	35(56.50)	47(50.50)	105(50.70)		
	Do not know	10(19.20)	6(9.70)	6(6.50)	22(10.60)		
	disagree	1(1.90)	0(0)	0(0)	1(0.50)		
Systematic protocols help to check presence of secondary behaviors	strongly agree	16(30.80)	22(35.50)	29(31.20)	67(32.40)	11.2	0.083
	agree	25(48.10)	32(51.60)	57(61.30)	114(55.10)		
	Do not know	7(13.50)	7(11.30)	7(7.50)	21(10.10)		
	disagree	4(7.70)	1(1.60)	0(0)	5(2.40)		
The frequency count of primary and secondary behaviors helps in assessing behavior	strongly agree	18(34.60)	20(32.30)	38(40.90)	76(36.70)	9.87	0.274
	agree	27(51.90)	35(56.50)	51(54.80)	113(54.60)		
	Do not know	6(11.50)	4(6.40)	4(4.30)	14(6.80)		
	disagree	0(0)	2(3.20)	0(0)	2(1.00)		
	strongly disagree	1(1.90)	1(1.60)	0(0)	2(1.00)		

the measurement of speech rate also helps in assessing the level of stammering	strongly agree	14(26.90)	14(22.60)	43(46.20)	71(34.30)	20.14	0.01*
	agree	32(61.50)	45(72.60)	42(45.20)	119(57.50)		
	Do not know	5(9.60)	3(4.80)	5(5.40)	13(6.30)		
	disagree	1(1.90)	0(0)	0(0)	1(0.50)		
	strongly disagree	0(0)	0(0)	3(3.20)	3(1.40)		
Observing and recording physiological measurements	strongly agree	10(19.20)	12(19.40)	32(34.40)	54(26.10)	12.97	0.044*
	Agree	30(57.70)	42(67.70)	49(52.70)	121(58.50)		
	Do not know	10(19.20)	8(12.90)	12(12.90)	30(14.50)		
	strongly disagree	2(3.80)	0(0)	0(0)	2(1.00)		
Interview the client and client family about social settings	strongly agree	10(19.20)	25(40.30)	50(53.80)	85(41.10)	26.17	<0.001*
	Agree	32(61.50)	35(56.50)	39(41.90)	106(51.20)		
	Do not know	6(11.50)	1(1.60)	1(1.10)	8(3.90)		
	Disagree	4(7.70)	1(1.60)	3(3.20)	8(3.90)		
Interview about developmental aspects	strongly agree	12(23.10)	22(35.50)	24(25.80)	58(28.00)	18.95	0.015*
	Agree	31(59.60)	24(38.70)	60(64.50)	115(55.60)		
	Do not know	5(9.60)	11(17.70)	6(6.5)	22(10.60)		
	Disagree	2(3.80)	5(8.10)	3(3.20)	10(4.80)		
	strongly disagree	2(3.80)	0(0)	0(0)	2(1.00)		
Make formal tests and observations related to intelligence	strongly agree	5(9.60)	6(9.70)	14(15.10)	25(12.10)	25.5	0.001*
	Agree	26(50.00)	39(62.90)	51(54.80)	116(56.00)		
	Do not know	15(28.80)	10(16.10)	25(26.90)	50(24.20)		
	Disagree	1(1.90)	7(11.30)	3(3.20)	11(5.30)		
	strongly disagree	5(9.60)	0(0)	0(0)	5(2.40)		
Make informal tests and observations related to intelligence	strongly agree	9(17.30)	4(6.50)	25(26.90)	38(18.40)	32.36	<0.001*
	Agree	20(38.50)	33(53.20)	51(54.80)	104(50.20)		
	Do not know	18(34.60)	17(27.40)	15(16.10)	50(24.20)		
	Disagree	2(3.80)	8(12.90)	2(2.20)	12(5.80)		
	strongly disagree	3(5.80)	0(0)	0(0)	3(1.40)		

Administration of formal tests	strongly agree	13(25.00)	15(24.20)	22(23.70)	50(24.20)	10.77	0.375
	Agree	22(42.30)	27(43.50)	52(55.90)	101(48.80)		
	Do not know	12(23.10)	12(19.40)	14(15.10)	38(18.40)		
	Disagree	4(7.70)	8(12.90)	5(8.60)	16(7.70)		
	strongly disagree	1(1.90)	0(0)	0(0)	2(1.00)		
Administration of informal tests	strongly agree	13(25.00)	13(21.00)	28(30.10)	54(26.10)	5.23	0.54
	Agree	22(42.30)	32(51.60)	35(37.60)	89(43.00)		
	Do not know	11(21.20)	13(21.00)	17(18.30)	41(19.80)		
	Disagree	6(11.50)	4(6.50)	13(14.00)	23(11.10)		
Total		**52(100)**	**62(100)**	**93(100)**	**207(100)**		

Table 3. Assessment and analysis of treatment strategy from speech pathologists

Treatment		Qualification			Total	Chi-Square	P-Value
		Diploma	BS	MS			
Lidcombe program	extremely effective	13(25.00)	11(17.70)	33(35.50)	57(27.50)	26.71	0.001*
	very effective	23(44.20)	29(46.80)	36(38.70)	88(42.50)		
	moderately effective	8(15.40)	22(35.50)	22(23.70)	52(25.10)		
	slightly effective	6(11.50)	0(0)	2(2.20)	8(3.90)		
	not at all effective	2(3.80)	0(0)	0(0)	2(1.00)		
Speech essay as a treatment approach for stammering	extremely effective	10(19.20)	17(27.40)	21(22.60)	48(23.20)	9.39	0.153
	very effective	29(55.80)	24(38.70)	47(50.50)	100(48.30)		
	moderately effective	11(21.20)	15(24.20)	24(25.80)	50(24,20)		
	slightly effective	2(3.80)	6(9.70)	1(1.10)	9(4.30)		

Delayed auditory feedback	extremely effective	4(7.70)	1(1.60)	22(23.70)	27(13.00)	28.64	<0.001*
	very effective	19(36.50)	25(40.30)	30(32.30)	74(35.70)		
	moderately effective	17(32.70)	31(50.00)	28(30.10)	76(36.70)		
	slightly effective	10(19.20)	3(4.80)	13(14.00)	26(12.60)		
	not at all effective	2(3.80)	2(3.20)	0(0)	4(1.90)		
Fluency shaping is used to replace stuttered speech	extremely effective	11(21.20)	10(16.10)	26(28.00)	47(22.70)	13.161	0.041*
	very effective	32(61.50)	44(71.00)	46(49.50)	122(58.90)		
	moderately effective	6(11.50)	3(4.80)	18(19.40)	27(13.00)		
	slightly effective	3(5.80)	5(8.10)	3(3.20)	11(5.30)		
Use of computed assisted devices	extremely effective	10(19.20)	3(4.80)	22(23.70)	35(16.90)	33.99	<0.001*
	very effective	16(30.80)	9(14.50)	20(21.50)	45(21.70)		
	moderately effective	19(36.50)	28(45.20)	42(45.20)	89(43.00)		
	slightly effective	5(9.60)	22(35.50)	7(7.50)	34(16.40)		
	not at all effective	2(3.80)	0(0)	2(2.20)	4(1.90)		
Reduction of speech associated anxiety helps in controlling stammering behavior	extremely effective	15(28.28)	21(33.90)	42(45.20)	78(37.70)	25.32	0.001*
	very effective	30(57.70)	25(40.30)	38(40.90)	93(44.90)		
	moderately effective	7(13.50)	6(9.70)	12(12.90)	25(12.10)		
	slightly effective	0(0)	8(12.90)	1(1.10)	9(4.30)		
	not at all effective	0(0)	2(3.20)	0(0)	2(1.00)		
Help the client learn ways to be dysfluent in a normal way	extremely effective	12(23.10)	7(11.30)	11(11.80)	30(14.50)	27.43	0.001*
	very effective	26(50.00)	22(35.50)	47(50.50)	95(45.90)		
	moderately effective	7(13.50)	16(25.80)	31(33.30)	54(26.10)		
	slightly effective	3(5.80)	12(19.40)	3(3.20)	18(8.70)		
	not at all effective	4(7.70)	5(8.10)	1(1.10)	10(4.80)		
Reduction of oral and vocal muscular tension during speech is effective	extremely effective	21(40.40)	16(25.80)	31(33.30)	68(32.90)	16.04	0.042*
	very effective	25(48.10)	34(54.80)	46(49.50)	105(50.70)		
	moderately effective	2(3.80)	12(19.40)	15(16.10)	29(14.00)		
	slightly effective	3(5.80)	0(0)	1(1.10)	4(1.90)		
	not at all effective	1(1.90)	0(0)	0(0)	1(0.50)		
Total		**52(100)**	**62(100)**	**93(100)**	**207(100)**		

In table 1, it is shown that 89% of respondents were females, 44.90% of respondents were having MS level qualifications, 45% of the speech-language pathologists were working in special education schools & 29% were doing their private practice. 43.5% of speech and language pathologists were having 2-5 years of clinical experience and 52% of respondents were using fluency shaping, lid comb, speech easy, and delayed auditory feedback as treatment practices for persons with speech problems, and 66.70% of patients become more fluent after having any of these treatment practices.

In Table 2, the p-value of 0.01 shows a significant association between qualification and assessment practices for stammering as speech-language pathologists with MS level strongly agreed that observing a client's speech during an interview is a best practice for assessing the stammering behavior, p-value 0.035 shows a significant association between qualification and assessment method as speech-language pathologists with MS level strongly agreed that observing the client speech while performing a specific task is a good way to assess the stammering behavior of the client, p-value 0.01, 0.044, 0.015 and 0.001 shows more significant association b/w qualification and assessment methods the respondents with MS level qualification found the measurement of speech rate, interview and observing physiological & developmental aspects and making formal tests & observation of intelligence as best assessment ways of stammering respectively.

While in table 3, the p-value of 0.001, 0.041, and 0.042 show a significant association b/w qualification and treatment practices because speech & language pathologists with MS level education were using reduction of oral vocal muscular tension while treating the individuals who stammer, reduction of speech-related anxiety greatly helps in treating the stammering behavior. While respondents were also using delayed auditory feedback and computer-assisted devices for treatment of stammering respectively and found them as moderately effective treatment methods. Speech-language pathologists indicated the use of speech easy helps in treating the stammering behavior.

Table 4. Mean comparison between assessment and treatment

Comparison of the mean score		Mean ± SD	95% Confidence Interval for Mean		F-test	P-Value
			Lower Bound	Upper Bound		
Assessment	Diploma (n=52)	29.21±6.83	27.3102	31.1129	3.585	.03*
	BS (n=62	28.58±5.35	27.2231	29.9382		
	MS (n=93	26.62±6.20	25.3458	27.9015		
Treatment	Diploma (n=52)	17.50±3.51	16.5238	18.4762	7.06	.001*
	BS (n=62	19.00±3.88	18.0138	19.9862		
	MS (n=93)	16.59±4.13	15.7400	17.4428		

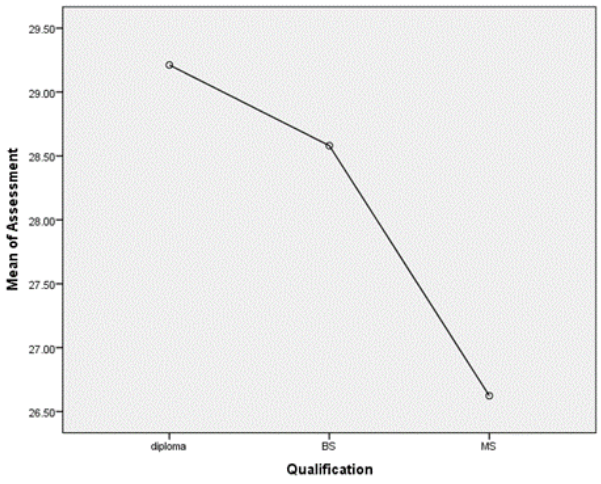
In the above table, the p-value shows that the more qualified speech-language pathologists will be the better assessment and treatment methods will be used for stammering.

Tables 5. Multiple Compassion

Dependent Variable			Mean Difference (I-J)	Std. Error	P-Value	95% Confidence Interval	
						Lower Bound	Upper Bound
Assessment	Diploma	BS	0.63089	1.15254	0.848	-2.0902	3.3520
		MS	2.58788*	1.06131	0.041*	0.0822	5.0936
	BS	MS	1.95699	1.00492	0.128	-0.4156	4.3295
Treatment	Diploma	BS	-1.50000	0.73533	0.105	-3.2361	0.2361
		MS	0.90860	0.67712	0.374	-0.6900	2.5073
	BS	MS	2.40860*	0.64114	0.001*	0.8949	3.9223

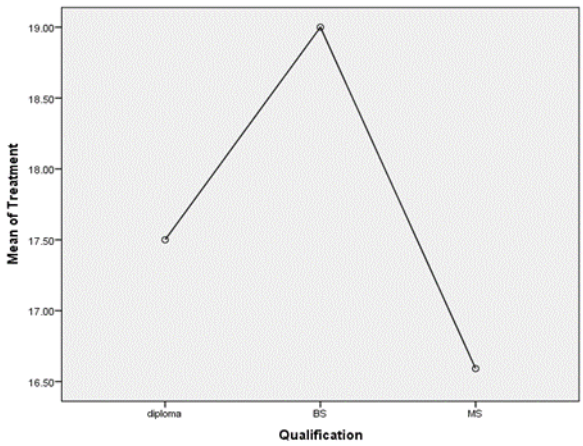
"*" indicates the statistically significant results

Figure:1 Data analysis and graphical representation by



mean assessment and qualification

Figure:2 Data analysis and graphical representation



using treatment and qualification

Discussion

This study aims to investigate the assessment and treatment practices for stammering used by speech-language pathologists. The current study revealed that several ways are used by speech-language pathologists for the assessment of stammering. Assessing the speech of a client during different social situations like during daily activities or at the time of formal situations greatly helps in the assessment of stammering and most speech-language pathologists use this technique. The findings of this research are consistent with the findings of (Jan McAllister, 2017) that adults with stammering experience significant emotional anxiety at the time of social communication so there is a need to give attention to assessing the communication in different social situations for assessing stammering behaviors at the time of speech therapy.

In general, the findings of this study indicated that fluency shaping is most popular among speech-language pathologists. Respondents stated that it has very effective results than other treatment approaches. While combining the treatment approaches, it is found that delayed auditory feedback and the use of computer-assisted devices as treatment practices are less popular among speech-language pathologists as the respondents indicated these approaches as moderately

The other approaches like speech essay, the Lidcombe program, reduction of speech-related anxiety, and helping the client to be dysfluent in a more comfortable manner as treatment practices for stammering are used by the speech-language pathologists, and they responded to them as very effective ways for clients who stammer.

The analysis of incident and frequent diagnoses of a speech and language disease, including stuttering, cluttering, and developmental abnormalities of speech and language, and the evaluation of speech therapy treatment patterns represent the first countrywide study using German health insurance data. There has been a lot of discussion lately about how many kids are getting treatment for problems with their language development. Our findings are in line with this widely documented national trend (Sommer, Waltersbacher, Schlotmann, Schröder, & Strzelczyk, 2021) The age distribution found in this study is in line with the known epidemiology of speech and language impairments, which peak between the ages of 4 and 5 years old, at which time active language development is occurring. This peak occurs sooner for stuttering, between 30 and 36 months of age (Bothe, 2004).

The allocation of treatment resources is another debated topic (Hasselhorn & Sallat, 2014). Our population -based investigation produced fresh perceptions on treatment prescription practices. Despite the fact that the ICD-10's diagnosis-based coding method does not account for the severity of the condition or the necessity for therapy, some afflicted people did not obtain treatment. As a result, a sizable number of those who are impacted may choose not to seek therapy since they are only marginally or transiently affected. As a matter of fact, spontaneous recovery happens quickly, usually during the first few months of speech dysfluency, and the majority of patients recover within the first two years following the commencement of the condition (Yairi & Ambrose, 1999), although the extent of early recovery is debated(Reilly et al., 2013) .

Even if the neurological causes of stuttering are well known (Neef, Anwander, & Friederici, 2015), The variables that govern the progression of recovery or persistence are still enigmatic. The chance of recurrence after therapy is increased by comorbid conditions, such as anxiety or other mental illnesses (R. Menzies et al., 2019). This investigation may confirm a greater frequency of comorbidities in cohorts with stuttering, cluttering, or developmental speech and language difficulties. Additionally, persistent stuttering is linked to atopic diseases like hay fever (Strom & Silverberg, 2016),(Ajdacic-Gross et al., 2020).

The past few decades have seen a great deal of research on the neurophysiological changes that mirror processes like treated stroke recovery or motor learning that are comparable to the recovery from stuttering. For instance, contrary to the previous belief that motor learning was mostly relegated to childhood and prepuberty, it is now understood that permanent plastic remodeling also occurs in adults, and that plastic alterations in the motor cortex occur when new motor abilities are acquired quickly (Ingham, Grafton, Bothe, & Ingham, 2012)..

The insula and putamen were among the areas that had noticeably higher activations in the left hemisphere speech-related areas. A later investigation by (Giraud et al., 2008), The caudate nucleus and the substantia nigra, which the KST tended to normalize, seemed to further characterize basal ganglia activations associated to stuttering severity. Stutterers are frequently pulled into therapies based on the notion that stuttering is still seen as a psychological or mental illness in many areas of the world. We are aware that those therapies frequently fail to enhance fluency or noticeably lessen the severity of stuttering, most likely because they do not engage the auditory-speech motor integration mechanisms that are essential to fluent speaking. Nevertheless, in light of the data discussed in this study, stutterers who want to speak fluently should be supported (Ingham, Ingham, Euler, & Neumann, 2018).

A neurodevelopmental illness called stuttering, also known as childhood-onset fluency disorder, starts while the brain networks that enable speech, language, and emotional activities are forming quickly. The multifactorial dynamic pathways hypothesis drives experimental and clinical research to identify the precise elements that each child's stuttering diagnosis is

influenced by, as well as those that are most likely to encourage recovery (Smith & Weber, 2017).

The complete stuttering therapeutic method was successful in lowering the participant's core behaviors, secondary behaviors, and negative sentiments and attitudes, according to an analysis of the data from the assessment measures. evaluation and Fluency disorder treatment should encourage a client-specific, multifaceted approach. It goes beyond the primary and secondary behaviors by taking into account the social and emotional aspects of fluency issues that are hidden (Mupawose & Karani, 2020).

Although all three elements of an evidence-based study EBP strategy are crucial for success, I focus on the importance of external research evidence in this article since it lends the clinical decision-making process the most impartiality. Additionally, because speech-language pathology is a science-driven field, we may be missing the chance to implement the best course of action for children like David and his parents who depend on us as highly ethical professionals if we downplay or ignore the pertinent external research evidence that has been published in our peer-reviewed journals. We may make more educated choices about clinical concerns when we have a thorough comprehension of the scientific findings, which reduces our reliance on the expert's personal judgment (Nelson & Gilbert, 2020).

In the present study, reduction of oral vocal muscular tension, reduction of speech-related anxiety, and helping the client be dysfluent in a more comfortable manner are very effective treatment approaches. These all come under the category of stammering management. These management therapies emphasize the desensitization of stammering, like reducing muscular tensions during speech moments, all of which are part of cognitive behavior therapy. The findings of this research are consistent with the research that was conducted in 2012, and the results of that research concluded that reducing the fear and anxiety of stammering, developing the acceptance level among the individuals who stammer, and teaching them to stammer with decreased efforts are help full stammering management techniques(Blomgren, 2012).

The findings that are reducing speech-related anxiety are very effective in treating stammering are also consistent with the results of research that were conducted in 2008 and the findings of that research exolianed that treating the social phobias among the individuals who stammer can effectively eliminate the fear and anxiety and dramatically improve the general functioning of daily living and in return helps to treat stammering(R. G. Menzies et al., 2008).

The findings of this research regarding the stammering management approaches are inconsistent with the findings of multidimensional assessment of treatment outcomes. The study concluded that these approaches do not treat stuttered speech per second but only focused on secondary behaviors like fear, anxiety, and acceptance of being a stammer while respondents of the present study found these approaches very effective for treating the stammering(Blomgren et al., 2005).

The findings of this research indicated that fluency shaping or speech restructuring therapies are very effective treatment ways for individuals who stammer and the findings are consistent with a research that was conducted on precision fluency shaping that focused on prolonged speech techniques like slow speech or syllable stretched speech as these approaches help the client to improve their control on the speech mechanism (Webster, 1980).

According to the findings of present research delayed auditory feedback is less popular among speech-language pathologists as they responded to this approach as a moderately effective treatment and the findings of the study are inconsistent with the results of J Van Borsel et al., which concluded that DAF is a very effective treatment for stammering and it not only treats the stammering but also helps in improving fluency when this approach used for a longer period (Van Borsel, Reunes, & Van den Bergh, 2003).

In the present study, computer-assisted devices for enhancing fluency are considered as least effective by the speech-language pathologists and findings are inconsistent with the recent research that explained that computer-assisted devices show graphical representation and wavelength of speech on the screen which

can be seen by the clients and these things can encourage and motivate the clients to enhance their fluency so there must be rewards for motivation the clients while using computer-assisted devices in treating stammering behaviors (Silverman, 1996).

Conclusion

In this study, speech-language pathologists rated computer-assisted devices for improving fluency as the least effective, which contradicts recent research that stated that computer-assisted devices display graphical representations and wavelengths of speech on a screen that clients can see, and that these things can encourage and motivate clients to improve their fluency, so there must be incentives for clients to improve their fluency. It was concluded that observation of a client's speech and fluency shaping are assessment and treatment methods used by speech-language therapists and these played a very important role in the management of stammering among individuals who stammer.

Conflict of Interest

Declare no conflict of interest.

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Ethical approval

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Author's contributions

RK and AI were involved in the execution of the project. AR and MSN designed, executed the study and wrote the manuscript. SAZ and EA helped in organization of data and did the statistical analysis. MK helped in the editing. All named authors have read and approved the final version of the manuscript.

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