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# A clinical training model for students: intensive treatment of stuttering using prolonged speech

**ABSTRACT**

**Purpose:** This study describes a practical model for improving the quality of Speech-Language Pathology (SLP) education on a clinical setting in a Bulgarian University. During this study, adults who stutter (AWS) received intensive treatment (IT) to increase fluent speech. The intensive treatment was delivered by students trained in the SLP Master's degree program "Logopedics Management in Fluency and Voice Disorders". **Methods:** The La Trobe University intensive program of prolonged speech was implemented. SLP students were trained and delivered the IT for AWS, under supervision in all stages. The treatment followed a clinical modeling pattern. **Results:** The primary outcomes were measured according to (i) percent of syllables stuttered (%SS) within and outside the stuttering research center of the university; (ii) self-reported inventory scores; and (iii) speech naturalness score evaluations from pre-treatment, immediately following treatment, 11 months post-treatment, and 18 months after the intensive treatment using stutter-free speech samples. The outcomes were reported for the overall IT program delivered by the SLP Master students. **Conclusion:** The treatment delivered by students can ensure *objective* speech outcomes. The evidence-based practice model allowed students to develop and master specific clinical skills in establishing fluent speech by applying a prolonged speech technique. During the IT experience, students began to incorporate elements of evidence-based practice (EBP), clinical expertise, and consider values held by AWS. After four outcome-sessions, the AWS developed self-consciousness about the quality of their prolonged speech during controlled fluent patterns. The participants produced objective speech fluency data and statistically significant differences before and immediately after the IT regarding %SS and overall speech naturalness.

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## INTRODUCTION

The revised International Association of Logopedics and Phoniatrics (IALP) guidelines<sup>(1)</sup> provide relevant information on the education and training of logopedists. The illustrative framework states that students should receive training in fluency disorders. According to the SLP curricula of Bulgarian universities, logopedists should be competent to treat fluency disorders across the lifespan. The learning goals of the Master's degree students intend to provide a framework for their active engagement in the learning processes inside and outside the classroom. Each student must demonstrate the appropriate knowledge, attitudes, and professional skills associated with specific goals and outcomes, such as integrated reflective reasoning for evidence-based practice in stuttering. Furthermore, students must demonstrate specific organization, motivation and appropriate skills for the assessment and treatment of stuttering. Professional involvement and dissemination, regionally and nationally, are very important, because stuttering topics are related to specific research-based understanding of the range of clinical delivery models available for professional practice.

An earlier study by Georgieva<sup>(2)</sup> reported that logopedists do not feel sufficiently trained or comfortable to treat stuttering. A total of 150 questionnaires were sent to three different Bulgarian universities, with 107 responses. One of the conclusions was that most of the students in the SLP Bachelor of Arts (BA) program observed an average of 3 people who stutter throughout their training. This number increased to 5 people, and in some cases up to 10, during the specialized Master's degree course, which indicates that observation and direct clinical experience were emphasized<sup>(2)</sup>. In addition, the research outcomes revealed that most of the Bulgarian students in the SLP BA program had limited experience with stuttering; therefore, a particular emphasis is put on clinical practice and stuttering within the framework of Master's degree programs.

The results of the aforementioned survey of student training in Bulgaria had very important implications. The most obvious finding was that, in general, training in fluency disorders is limited and insufficient. The results of the Bulgarian survey agree with previous studies showing that logopedists do not feel competent treating stutter<sup>(3-5)</sup>. Due the lack of evidence-based practice guidelines in Bulgaria regarding stuttering, it is difficult to offer optimal clinical education and training for students and clinicians. On the other hand, as many authors, both in Bulgaria and abroad, have pointed out in their previous research, the Bulgarian health system does not offer any kind of logopedic treatment for adults who stutter<sup>(6)</sup>. Moreover, Tcholakova et al.<sup>(7)</sup>, Orlikoff et al.<sup>(8)</sup> underscored that students must acquire and maintain the knowledge and skills related to evidence-based practice necessary to provide high-quality professional services.

Refining the results by using the word "Stuttering" across the 1980-2015 period resulted in 13 Systematic Review and Meta-Analysis Study articles on stuttering. The American Speech-Hearing Association (ASHA) recommends using 6 meta-analysis articles as external scientific evidence, particularly for adults who stutter (AWS)<sup>(9-14)</sup>.

In Canada, Boberg and Kully worked to develop intensive treatment programs for adults and teenagers who stutter<sup>(15-17)</sup>. They implemented a 3-week intensive comprehensive stuttering program where the AWS met for 7 hours each weekday. Their study revealed a "[...] sharp decrease in mean %SS scores from the pre- to post-treatment recording, but with some increase in the mean %SS scores during the follow-up period"<sup>(17:1055)</sup>.

The Australian clinical psychologist Craig (1998) developed a one-week smooth speech intensive course for AWS<sup>(18)</sup>. The participants were taught the basics of smooth speech in different speech situations. A very successful student delivered an intensive treatment for AWS that also was implemented by Australians researchers<sup>(19-21)</sup>.

The reason to select the prolonged speech treatment in intensive format was that the speech restructuring treatments have proved to be very efficient in adults who stutter<sup>(16,22-24)</sup>.

Finally, the results discussed by Georgieva<sup>(2)</sup> presented an opportunity to update specific components of the Master's program curriculum to reflect the increasing knowledge and trends in education practices according to leading models.

## PURPOSE

The main purpose of the present study is to enhance the quality of the academic Speech-Language Pathology Master's degree training through the application of an intensive treatment (IT) program for adults who stutter (AWS). The specific aims of the research are: to (i) demonstrate that the Master's degree program meets the International Association of Logopedics and Phoniatrics (IALP) and Standing Liaison Committee of EU Speech and Language Therapists and Logopedists (CPLOL) standards for successful students' training; (ii) report speech fluency outcomes for IT; and (iii) evaluate the possible activity limitations that AWS face in everyday life.

As a *specific purpose*, the progress in terms of improvement was examined during the IT sessions delivered by Master's degree students. *Additionally*, data were gathered through a Self-Report Inventory about the AWS' perceptions of their own speech behavior following the IT.

## METHODS

The La Trobe University intensive program of prolonged speech was implemented<sup>(25)</sup>. The treatment followed a clinical modeling pattern by students as the main method. According to Leight<sup>(26:49)</sup>, modeling "[...] is the demonstration of the behavior change goal so that our clients know what we expect them to do". The quality of student training will be assessed by applying a specific measurement of the fluency components of speech recommended by the authors of the La Trobe program: percent syllables stuttered (%SS) within and outside the clinic; (ii) self-reported inventory scores; and (iii) speech naturalness score evaluations from pre-treatment, immediately following treatment, 11-months post treatment, and 18-months after the intensive treatment. The increasing level of client's speech fluency is a mark of well-developed Master students' therapeutic skills. The self-reported inventory developed by O' Brian and

the team from the Australian Stuttering Research Center is also an instrument proving the satisfaction of AWS from students' therapeutic skills.

SLP students were trained and delivered the IT for AWS under supervision at every stage.

The South-West University Research Ethics Committee approved the present study by official permit number 1502-1-1/18 February 2015.

## Participants

A total of 12 AWS (10 men and 2 women), with an age range of 18-29 years (mean 22.5 years), participated in the study and were separated into two groups. Subjects 1 to 6 were involved in the first week while subjects 7 to 12 participated in the second week. Each participant had two clinician students allocated throughout the 8-week program. During the 7-week follow-up maintenance stage, students provided seven sessions of logopedical support for the first group of AWS every Tuesday, and for the second group, every Friday. The inclusion criteria were: (i) 18 years and above; (ii) seeking treatment for stuttering; (iii) onset of developmental stuttering occurred before 10 years of age; (iv) SS must be greater than 2% at the initial pre-treatment assessment stage.

Each patient had two clinician students allocated throughout the 8-week program. All research participants' members presented consent declaration.

## Treatment program

The treatment program was built on the basis of the La Trobe University intensive program of prolonged speech<sup>(19,25)</sup>. In fact, it was an adapted Bulgarian model of La Trobe Intensive Program: student delivered treatment for adults, designed with the support of Dr. Susan Block.

A literature overview was completed covering 94 published articles in Web of Science regarding prolonged speech application in stuttering from 1950-2015, with the first article published in 1973<sup>(27)</sup>. Articles by Andrews et al.<sup>(28)</sup>, Onslow et al.<sup>(22)</sup>, O'Brian et al.<sup>(23)</sup>, and Bothe et al.<sup>(10)</sup> were among the most cited articles and are the most influential studies regarding prolonged speech application in the area of stuttering. The research-based

evidence on the effectiveness of the prolonged speech model in an intensive format predetermined the selection of this particular program. Research data reported on the efficiency of speech restructuring treatments of adults who stutter are available<sup>(17,20,24)</sup>.

The adapted IT model using prolonged speech was carried out at the Bachinovo University Center for 5 consecutive days. The intensive program included three treatment stages: instatement stage (3 days); transfer stage (2 days); and maintenance stage (7 sessions) (Table 1).

The program incorporated a traditional behavior approach to obtain fluent speech. The systematic increase of speech rate started from 60 syllables per minute (SPM) and finished at the "comfort" rate, 200/210 SPM (see The La Trobe Smooth Speech Clinic Program Manual)<sup>(12)</sup>. The speech task duration ranged from 30 seconds to 10 minutes, using conversation, monologues, and reading. Master's students were responsible for collecting stuttering and speech rate measures using stopwatches. The patient's speech was recorded using a Dictaphone Olympus VN-731PC-E1, which was provided to each student at the beginning of the IT.

## Student involvement

Twelve students delivered the intensive training: 9 Master's students in the final year of their graduate course in the SLP program; 2 in the last year of their undergraduate training in SLP; and one PhD student. Prior to the delivery of the IT program, all students had completed (i) 60 hours of a BA-level course in fluency disorders; and (ii) 60 hours of an MA degree course for stuttering management. In addition, they were trained in prolonged speech application for 12 hours by Dr. S. Block, in June 2015, and received an additional 12 hours of training by the first author D. Georgieva (including 4 hours of training in the identification and measurement of stuttered and fluent syllables). Before participating in the IT course, all students were supplied with treatment materials in Bulgarian.

Clinician students were supervised by three experienced practitioners who provided written and oral feedback on each student's clinical performance throughout the 8-week intensive treatment. Supervising sessions were held before IT, after every IT day, and in the follow-up stage.

**Table 1.** Stages and descriptions of IT using prolonged speech

	Instatement stage	Transfer stage	Maintenance stage
Total duration of the program: 54 hours, 8 weeks	3 days, 8 hours each day	4 <sup>th</sup> and 5 <sup>th</sup> day, 8 hours each day	7 follow-up sessions, conducted across 7 weeks, 2 hours each week
Stages description	<ul style="list-style-type: none"> <li>a. Prolonged speech</li> <li>b. Emphasize speech naturalness</li> <li>c. Gentle onsets</li> <li>d. Sliding in</li> <li>e. Elongating vowels</li> <li>f. Linking words together</li> </ul>	<ul style="list-style-type: none"> <li>a. Hierarchy of speaking situations constructed by client prior to treatment</li> <li>b. Situations are different for each AWS (five to sixteen steps in these hierarchies)</li> </ul>	<ul style="list-style-type: none"> <li>a. The patients discuss setting tasks they would like to practice between each session. The goal is to use their strategies all the time.</li> <li>b. Self-management strategies taught: self-monitoring and self-evaluation</li> <li>c. Parents and friends involved</li> </ul>
Forms of treatment	Intensive and spaced; Individual and group treatment	Intensive and spaced; Individual and group treatment	Individual (2h) and group opportunities (2h). It could be different and is tailored to the patient's needs.

## Outcome measures

Speech outcomes were measured from extracted speech samples obtained on three occasions: (i) one week before the start of IT; (ii) one day before the start of IT; and (iii) immediately after IT. On each occasion, four 10-minute speech samples were obtained and recorded for analysis: (i) a telephone call with a familiar person at home; (ii) a conversation with a familiar person at home; (iii) a conversation with a Master's student at the clinic; and (iv) monologue speaking at the clinic. The telephone situation was selected because each of the participants reported,

during the clinical assessment, that this was the most difficult speaking situation for them<sup>(17:1052)</sup>. Monologue samples were chosen because they were the clearest and most consistent in terms of sound quality. Usually clinicians need the larger continuous samples of speech for analysis. The data obtained 11 months and 18 months after the intensive treatment includes changes in the third and fourth speech samples: (iii) conversation outside the clinic; and (iv) monologue outside the clinic.

Percent syllables stuttered (%SS), speech naturalness (Nat), and self-report inventory (SRI) scores were the speech outcome measures (see Table 2 and Table 3).

**Table 2.** Mean and standard deviations (SD) for percentage of syllables stuttered (%SS) and naturalness (NAT) scores at each assessment

Measure	Situations	1 week pre-treatment	1 day pre-treatment	Immediately after the IT	11 months after the IT	18 months after the IT
Mean %SS (SD)	Monologue-clinic	11.9 (1.38)	12.4 (1.33)	2.6 (0.5)	1.5 (0.1)	2.6 (0.1)
	Conversation-clinic	10.8 (1.37)	11.4 (1.4)	2.5 (0.9)	1.5 (0.1)	2.5 (0.1)
	Telephone-home	9.8 (1.19)	10.3 (1.22)	1.4 (0.69)	1.4 (0.1)	2.5 (0.1)
	Conversation-home	7.3 (1.21)	8.1 (1.22)	0.9 (0.72)	1.4 (0.1)	2.5 (0.1)
Mean NAT	Monologue		6 (1.044)	1.58 (0.51)	2.1 (0.71)	2.2 (0.45)

**Table 3.** Mean Participant Self-Reported Inventory Scores for the present study compared with mean scores reported by Cocomazzo et al.<sup>(24)</sup>, Block et al.<sup>(20)</sup>, and O'Brian et al.<sup>(23)</sup>

Participant Self-Reported Inventory item	Present study <i>n</i> = 12	Cocomazzo et al. <sup>(24)</sup> <i>n</i> = 12	Block et al. et al. <sup>(20)</sup> <i>n</i> = 34	O'Brian et al. <sup>(23)</sup> <i>n</i> = 16
1. How would you rate your speech on an average day now? 1= 'no stuttering', 9='extremely severe stuttering'	1.5	3.1	3.2	2.8
2. How would you have rated your speech on an average day before beginning this treatment? 1= 'no stuttering', 9='extremely severe stuttering'	5.7	4.6	6.5	5.5
3. How satisfied are you with your present level of fluency? 1='extremely satisfied', 9='totally dissatisfied'	1.1	3.3	3.6	3.4
4. How satisfied were you with your level of fluency before beginning this treatment? 1='extremely satisfied', 9='totally dissatisfied'	6.3	5.5	7.4	7.6
5. How much of the time do you now have control over your stuttering outside the clinic? 1='none of the time', 9='all of the time'	6.3	5.9	6.4	6.2
6. How much of the time did you have control over your stuttering outside the clinic before beginning this treatment? 1='none of the time', 9='all of the time'	2.8	4.6	3.1	3.0
7. How difficult did you find learning Prolonged Speech in the clinic? 1='very easy', 9='extremely difficult'	3.6	2.4	2.8	3.2
8. How easy is it to use Prolonged Speech outside the clinic? 1='very easy', 9='extremely difficult'	3.3	3.4	4.2	4.7
9. How comfortable are you using Prolonged Speech in social situations outside the clinic? 1='very comfortable', 9='extremely uncomfortable'	3.9	2.9	4.1	4.4
10. How much do you have to think about controlling your stuttering? 1='none of the time', 9='all of the time'	5.9	6.0	6.2	6.3
11. How would you rate the sound of your speech on an average day now? 1='very natural speech', 9='extremely unnatural speech'	2.5	2.9	2.9	2.7

**Table 3.** Continued...

Participant Self-Reported Inventory item	Present study <i>n</i> = 12	Cocomazzo et al. <sup>(24)</sup> <i>n</i> = 12	Block et al. et al. <sup>(20)</sup> <i>n</i> = 34	O'Brian et al. <sup>(23)</sup> <i>n</i> = 16
12. What is the most unnatural sounding speech you are prepared to use when talking with a friend? 1='very natural speech', 9='extremely unnatural speech'	4.5	4.3	4.5	3.2
13. What is the most unnatural sounding speech you are prepared to use in a situation where it is very important for you to control your stuttering (for example, a job interview)? 1='very natural speech', 9='extremely unnatural speech'	4.8	3.1	4.3	3.2
14. Do you prefer stuttering over using an unnatural speech pattern? 1='none of the time', 9='all of the time'	1.6	2.6	2.6	2.6
15. Is this level usually adequate to control your stuttering?	Yes= 9/12 (75%)	Yes= 5/8 (63%)	Yes= 21/34 (62%)	Yes= 9/13 (69%)
16. How satisfied were you working with clinician students during the treatment? 1='extremely satisfied', 9='totally dissatisfied'	1.1	3.1	-	-
17. How comfortable were you working with clinician students during the treatment? 1='extremely comfortable', 9='totally uncomfortable'	1.3	3.3	-	-
18. How satisfied were you with the amount of student supervision? 1='extremely satisfied', 9='totally dissatisfied'	1.3	2.5	-	-

### Percent Syllables Stuttered (% SS)

Stuttering was assessed as a percentage of syllables stuttered using the following model:

$$\frac{\text{Total SS}^*}{\text{Total Number of Syllables}} \cdot 100 = \% \text{ SS} \quad (1)$$

\*SS = syllable stuttered.

### Speech naturalness

Speech naturalness refers to the degree to which the AWS sounds like the fluent speakers of the same age and gender. Speech naturalness was measured according to a 9-degree scale, developed by the Australian Stuttering Research Center, where the higher scores indicated less natural speech. 15-second speech segments, extracted from both pre-treatment and immediately after IT clinic assessment, were used for this analysis. The aim of naturalness measurement was to decide whether AWS used a perceptibly more natural speaking style after the IT application. Monologue examples were chosen because of the continuous samples of speech they provided.

### Participant Self-report Inventory (PSRI)

The self-report inventory developed by O'Brian and the team from the Australian Stuttering Research Center consists of 18 items. All participants involved in this two-groups study completed this questionnaire. The inventory items and results can be seen in Table 3 (see the results section).

### Reliability

Reliability was measured using inter-rater agreement for %SS. Two observers assessed 12 randomly selected speech samples – three pre-treatment and three post-treatment samples per observer. All students and 2 clinicians specialized in stuttering served as raters. The transcription of all audio taped speech samples (syllable counts) was provided by each of the students. During the 4-hour rater training in counting, the two students were required to establish 90% agreement in counts of stuttered and fluent syllables with one of the supervisors (D. Georgieva) before they were permitted to analyze the four 10-minute samples. Supervisors and students were instructed to take a 5-minute break from counting every 20 minutes.

### Data analysis

The data obtained were calculated using the Wilcoxon signed rank test for hypothesis testing and %SS interpretation was done according to a nonparametric Friedman test. For the NAT analysis, a paired *t*-test was selected.

### RESULTS

Table 2 shows the measures of %SS and mean naturalness in several different speech samples.

Results of the Wilcoxon signed rank test revealed that AWS produced significantly less %SS from pre-treatment to post-treatment (immediately after the IT, 11 months post-treatment, and 18 months after the IT). Friedman analysis ( $p < 0.001$ ) was significant when comparing 1-day pre-treatment and after the IT data regarding:

- ✓ Monologue within clinic ( $\chi^2 = 12$ ,  $df = 3$ ,  $p = 0.000$ );
- ✓ Conversation in the clinic ( $\chi^2 = 10$ ,  $df = 3$ ,  $p = 0.000$ );
- ✓ Telephone situation at home ( $\chi^2 = 10$ ,  $df = 3$ ,  $p = 0.000$ );
- ✓ Home conversation ( $\chi^2 = 8$ ,  $df = 3$ ,  $p = 0.000$ ).

Significant changes regarding reduction of %SS were found one day before IT and 11 months after IT, regarding different speech examples: monologue outside of the clinic ( $Z = 3.059$ ;  $p < 0.01$ ), conversation outside of the clinic ( $Z = 3.062$ ;  $p < 0.01$ ), telephone at home ( $Z = 3.059$ ;  $p < 0.01$ ), and conversation at home ( $Z = 3.063$ ;  $p < 0.01$ ). The same percentage SS reduction tendency was maintained also one day before the IT and 18 months after the IT: monologue outside of the clinic ( $Z = 3.059$ ;  $p < 0.01$ ), conversation outside of the clinic ( $Z = 3.062$ ;  $p < 0.01$ ), telephone at home ( $Z = 3.062$ ;  $p < 0.01$ ), and conversation at home ( $Z = 3.061$ ;  $p < 0.01$ ).

We assumed that the %SS decreased significantly immediately after the IT, 11 months and 18 months after the IT for the respective speech situations mentioned above:

11 months after the IT: monologue outside of the clinic ( $Z = -2.988$ ;  $p < 0.003$ ), conversation outside of the clinic ( $Z = -2.809$ ;  $p < 0.003$ ), telephone at home ( $Z = 2.572$ ;  $p < 0.01$ ), and conversation at home ( $Z = 3.533$ ;  $p < 0.012$ ).

18 months after the IT: monologue outside of the clinic ( $Z = 0.767$ ;  $p = 0.443$ ), conversation outside of the clinic ( $Z = 2.316$ ;  $p = 0.021$ ), telephone at home ( $Z = 2.810$ ;  $p < 0.05$ ), and conversation at home ( $Z = 2.524$ ;  $p = 0.012$ ).

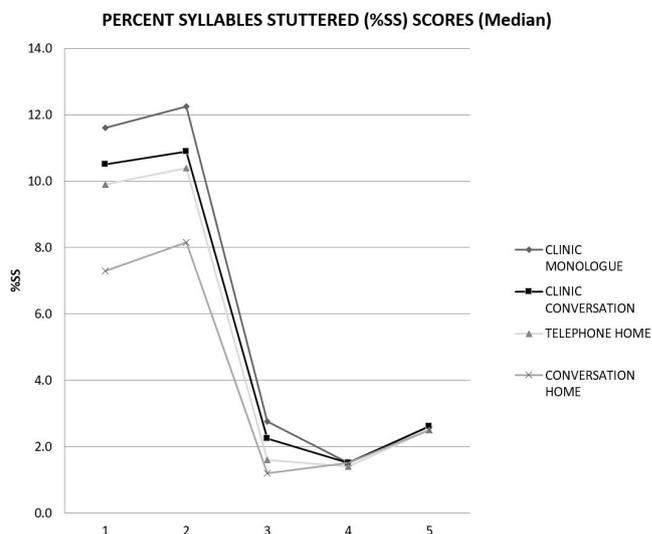
The results indicate that the group of AWS responded equally well to prolonged speech treatment and reduced considerably the percentage of syllables stuttered.

It could be concluded that similar trends were found across the speaking situations on all assessment occasions (Figure 1).

The mean naturalness score was 6 at pre-treatment period, 1.58 immediately after the IT, 2.1 11 months after the IT, and 2.2 18 months after the IT. The Friedman analysis ( $\chi^2 = 12$ ,  $df = 2$ ,  $p = 0.024$ ) showed significant changes ( $p < 0.05$ ). The Wilcoxon signed rank test results also indicate the same trend 11 months after the IT ( $Z = -1.933$ ;  $p < 0.053$ ) and 18 months after the IT ( $Z = -2.530$ ;  $p < 0.011$ ). Both results indicate that immediately after the treatment, as well as 11 months and 18 months after the IT, the participants were using the prolonged speech model to speak in a new modified manner in order to control their chronic stuttering (Figure 2).

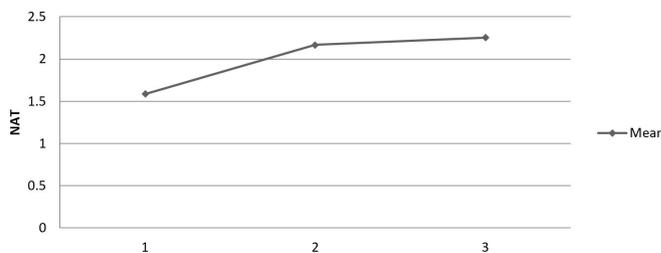
The Self-Report Inventory (SRI) was completed immediately after the third phase of IT as another measure of treatment outcome. Table 3 shows the mean scores for the present sample compared with previous Australian researchers' study data.

The first, second, and third SRI questions were completed one day before IT and immediately after treatment. Before IT, all the subjects reported to have severe stuttering (Q1 average score 6), rated their speech on an average of score 6 (Q2), and were dissatisfied with their present level of fluency (Q3 score 4). Immediately after the IT, the subjects reported remarkable changes in the registered scores of the same Q1, Q2 and Q3 – 1.5, 5.7, and 1.1, respectively (i.e. decreased severity of stuttering, increased fluency pattern including established naturalness as one of the essential components of the prosody).



**Caption:** (1) One week before the intensive treatment; (2) one day before the intensive treatment; (3) Immediately after the intensive treatment; (4) 11 months after the IT; (5) 18 months after the IT

**Figure 1.** Percent syllables stuttered (%SS) scores (median)



**Caption:** NAT = naturalness; (1) Immediately after the IT; (2) 11 months after the IT; (3) 18 months after the IT

**Figure 2.** Speech naturalness (mean) immediately after the intensive treatment, 11 months after the intensive treatment and 18 months after the intensive treatment

The data we obtained supports the purpose of this study to enhance the quality of the academic teaching in the SLP Master's program. The primary aim of the SWU Master's Degree Program in Speech-Language Pathology is to prepare students for professional careers as speech-language pathologists in clinical settings. In the present study, this is accomplished by providing intensive academic and clinical experiences designed to develop both broad and deep knowledge and specific skills regarding the prolonged speech intensive program in stuttering cases. By decreasing the level of disfluency and obtaining speech naturalness, the students demonstrated the successful completion of their academic training and specific clinical practice in stuttering cases.

Through academic training and clinical practice regarding the application of the prolonged speech model, the students successfully evaluated the obtained outcomes from stuttering disorder before, immediately after and 18 months after the intensive treatment. They successfully defined the problems and formulated the assessment and treatment solutions involving the measurement of syllables stuttered, naturalness and

self-perception. By applying the intensive treatment to AWS, the students demonstrated clinical competence suitable for a successful professional practice according to the IALP guidelines.

## DISCUSSION

For the first time in Bulgaria, the present study reports a short-term outcome regarding an intensive treatment of stuttering conducted by Master's degree students, and the results measured from an IT model using a prolonged speech technique with AWS. The interpretation of the results is that delivering the treatment by students can ensure *objective* speech outcomes. Both Master's students and AWS had access to the latest evidence-based treatment throughout the application of the prolonged speech technique.

Regarding the competences of Bulgarian students, certain responses to specific SRI items should be noted (questions 16, 17, 18). Immediately after the IT, 91% of the subjects indicated they were very satisfied with their new speech patterns. Many of the subjects gained the fluency skills to control the naturalness of speech and to sound fluent (question 6). They described their self-perceived rate of speech as very natural and fluent (question 12).

After four outcome sessions, the AWS developed self-consciousness about the quality of their prolonged speech controlled fluent patterns.

Bulgarian Master's degree students expressed satisfaction with their theoretical and practical preparation for the effective treatment of stuttering in adults. Therefore, student involvement in the adapted Bulgarian model of La Trobe University program of prolonged speech as an evidence-based learning in a university clinical setting could be seen as a successful combination of theoretical and practical learning. We can report an unquestionable benefit to the students as they: (i) were well trained to provide evidence-based assessment (%SS and naturalness) and treatment for a group of adult patients, who were generally left without a speech therapy service in the country; (ii) were *active* participants in group and individual treatment; (iii) were involved in such a *fruitful* combination of research and treatment; and (iv) felt more *confident* using a prolonged speech model in a clinical setting. In addition, the patients with stuttering enjoyed and were satisfied with the skills and competences of the Master's degree students (question 16, 17 and 18 of the SRI). Furthermore, the adults who stutter felt very comfortable with the students during the entire IT (question 17). The Master's students were able to interpret and analyze the data to determine the level of success of the chosen treatment technique and approach.

The present study compared the Bulgarian data obtained immediately after the IT and the SRI completed at 3-6 months post-treatment in the O'Brian et al.<sup>(23)</sup> study, at 3.5-5.0 years follow-up used by Block et al.<sup>(20)</sup>, and 12 months post-treatment by Cocomazzo et al.<sup>(24)</sup>. We realized that in long-term period %SS and NAT could be anticipated to decrease because of the multifactor influence on the AWS' speech. Nevertheless, participants in all four studies reported similar levels of satisfaction with their fluency (question 3), and the Bulgarian participants were most satisfied. Regarding question 4, the Bulgarian participants stand between the results of Block, O'Brian, and Cocomazzo. The Bulgarian

AWS demonstrated higher satisfaction from their work with Master's degree students (1.1) compared to the Australian AWS (3.1). Regarding question 17, the Bulgarian AWS felt extremely satisfied with their clinician students' work (1.3) compared to the Australian AWS (3.3). Similar to these results are the responses concerning question 18 – both the Bulgarian and Australian AWS felt extremely satisfied with the amount of student supervision (1.3-2.5).

Participants in all four studies exhibited similar scores for the items about the control of stuttering outside the clinic (question 5), learning prolonged speech in the clinic (question 7), amount of thinking involved in controlling stuttering (question 10), current level of speech naturalness (question 11), preference for an unnatural speech pattern over stuttering (question 14), and whether the level of unnatural sounding speech model is adequate to control stuttering (question 15).

## CONCLUSION

Finally, the Logopedics program at the South-West University in stuttering disorder management has developed a clinical curriculum for implementing an evidence-based practice model. This requires adequate student instruction with an emphasis on prolonged speech during their professional training and preparation. This study allowed Master's degree students to gradually gain expertise as they develop their specific clinical skills to establish fluent speech through a prolonged speech application. During the IT experience, students began to incorporate elements of evidence-based practice, clinical expertise regarding percentage of syllables stuttered and naturalness outcomes, as well as AWS values. The present study is the first clinical trial demonstrating that such results could be attained with the La Trobe prolonged speech model in a Bulgarian milieu<sup>(29)</sup>.

The present research-clinical trial with Master's degree students in SLP attempted to prepare them for a successful professional career. This study provided advanced and intensive academic and clinical experience designed to develop deep knowledge and skills regarding fundamental clinical practice in the assessment and treatment of stuttering.

The applied case-based learning approach to the master's degree university student training was an appropriate model for education in logopedics and was transferred successfully to the clinical practice setting. The study description in this article should be viewed as a general successful overview model of the application of prolonged speech in stuttering disorders with adults who stutter because of the significant reduction of the percentage of syllables stuttered over an 18-month period after the intensive treatment.

There is a pressing need to remodel the existing educational and research infrastructure at the South-West University to guarantee special facilities for IT format provision. It is necessary to meet AWS demands for an effective treatment, including a student delivery treatment model. It is of special interest to increase the number of Master's degree students to provide additional options to include a higher number of patients with stuttering. Georgieva<sup>(30)</sup> and Georgieva et al.<sup>(31)</sup> specified that future research should be oriented towards projects for program effectiveness and the evaluation and elaboration of cost-effective diagnostic tools.

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## Author contributions

*The present article authors' contribution is 70% (DG - first author) to 30% (RS). DG provided substantial contributions to the conception and research design of this work. She analyzed and interpreted all data of the study. Georgieva was drafting the work and revising it critically. She provided the final approval of the article, and ensured the appropriate investigation with adults who stutter. The first author wrote the full article text, prepared the statistics, and wrote the project Grant SRP A 15/15. She was the main investigator of the project and has provided training for PhD and Master's degree students. The second author, RS, was the most active part of the research process; providing data related to the prolonged speech research outcomes - % stuttering syllables and speech naturalness.*