

The use of the Lidcombe Program in treating Stuttering among Saudi Children

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Abstract

Background: It is known that operant treatments can control stuttering in children. However, at present it is unknown why such treatments are effective. The Lidcombe Program (LP) is an operant treatment for stuttering in preschool children for which favorable outcome and social validity data have been published.

Objective: To apply the Lidcombe Program on a sample of Saudi stuttering children, and to evaluate its results in order to decide if it is worth starting intervention for early stuttering or waiting for natural recovery.

Methods: This study was applied on 10 children suffering from stuttering for 6 months or more. They were assessed both subjectively and objectively. They were enrolled in therapy sessions using the Lidcombe Program for 25 weeks. This LP group was reassessed weekly to achieve both the clinician's rating score [stuttered words percentage (SW%)], using the Arabic version of stuttering severity index, and the parent's rating score [severity rating (SR)]. Ten age and gender matched stuttering children, who cannot attend for regular therapy, were included as a control group and were assessed only at two scheduled occasions with an interval of 25 weeks.

Results: The LP group of patients showed significant improvement ($p < 0.05$) in both the clinician's rating (SW%) and parent's rating scores (SR) by the end of the LP. The improvement in both scores started to be significant at the 5th week ($p < 0.05$) and this significant improvement was maintained throughout the rest of the program. By the end of the LP therapy both clinician rating (SW%) and parent rating scores revealed significant difference ($p < 0.05$) from the 1st week score.

While the control group showed no significant difference between the mean score of SW% at the two assessment occasions

Conclusion: This study supports implementing the Lidcombe Program in preschool years than waiting for spontaneous recovery. LP is proved to be also effective among Saudi stuturer children as its results were optimistic in other different social environments.

Keywords: Lidcombe Program, stuttering treatment, Saudi children, Arabic

Introduction

Speech and language therapists treating children who stutter appear to be assigned a difficult task. Although therapists have used a vast array of therapeutic protocols, the incidence and prevalence of childhood stuttering appears to have remained unchanged (1). Early intervention for stuttering in the preschool years was highlighted by Ward, (2006) who believed that stuttering becomes less tractable as children get older (2). Once stuttering becomes chronic, communication can be severely impaired with devastating social, emotional and educational effects.

It is known that operant treatments can control stuttering in children. However, at present it is unknown why such treatments are effective (3).

The Lidcombe Program (LP) is an operant treatment for stuttering in preschool children for which favorable outcome and social validity data have been published (4). It was developed at the Stuttering Unit, Bankstown Health Service, Sydney, Australia at the University of Sydney. It is a home based operant intervention program that is applied by parents of stuttering children at their homes in order to eliminate stuttering in their natural speaking situations (5,6). It is considered, lately, as the most effective program for treating early stuttering and considerable research studies have produced positive outcomes where stuttering has been shown to be no longer present, or remaining at very low levels showing validity and safety of the program (7,8,9).

Parents being the primary delivers of this therapy; they become able to apply therapeutic strategies in the LP,

rather than being involved in adjustment of parental style and other environmental variables as in Parent child interaction (PCI) approach (2).

In a recent study by Abou El-Ella et al, 2006, the Lidcombe program was used among Egyptian stuttering children, and results were compared with those of family counseling technique. Best improvement was noticed among those children receiving Lidcombe program, which again adds to the strength of the program. Jones et al, 2005, supported early intervention for stuttering and considered the LP as an efficacious treatment in children of preschool (8). Trials for the LP of early stuttering have found favorable outcomes by Harris et al, 2002, who provided evidence that the introduction of the LP has a positive impact on stuttering rate, which exceeds that attributable to natural recovery (10). Also, Woods et al, 2002, concluded that there is no reason to doubt that the LP is a safe treatment (4). It is worth examining this program in some details for a number of reasons, the most important of all is that it has been shown to be highly successful in a number of areas, but is still controversial in other areas (2).

The Saudi environment is a totally different environment from the Egyptian environment. Up to our limited knowledge, there are no previous evident studies included the application and the evaluation of the effectiveness of the Lidcombe Program in the Saudi society.

The aim of this work is to apply the Lidcombe Program on a sample of Saudi stuttering children, and to evaluate its results being applied in a totally different social environment in order to decide if it is worth starting intervention for early stuttering or wait for natural recovery.

Subjects and methods:

Subjects:

This study was applied on 10 children, who attended the Communication and Swallowing Disorders Unit (CSDU) at King Abdulaziz University Hospital and Dr. Soliman Fakeeh Hospital with chief complaint of parents that their children have non-fluent speech utterance with the following criteria:

1. Stuttering for duration of 6 months or more.
2. Stuttering doesn't consist of rhythmic syllable repetitions only.
3. Children and parents are not frustrated by the problem.
4. Parents are characterized by being positive and supportive of their children.
5. Parents are motivated for therapy, and can comply for regular weekly clinic visit.

6. Patients had average intelligence quotient (IQ ranged from 90-110) according to Stanford-Binet intelligence scale (11), and their language age was comparable to their chronological age according to Arabic language test (12).

A control group consisted of 10 patients- matched for age, gender and stuttering severity- who couldn't attend for regular visits, so they were not enrolled in LP therapy. They were assessed only at two occasions. First assessment was done at 1st week, while the second assessment was scheduled at the 25th week.

Assessment of all patients of both groups was done at first visit and at 25th week visit. All patients were subjected to subjective and objective assessments which include:

1. Parent's interview and full history taking giving special consideration to age of onset and the duration of stuttering.
2. Auditory perceptual assessment of both automatic speech and spontaneous speech for detection of intraphonemic disruptions, repetitions, prolongations and blocks.
3. Examination of vocal tract.
4. Recording of speech sample for 3 minutes using Sony MHC-F box nine Hi Fi component cassettes. The recorded materials included answers of the same questions set for all the patients, and description of some set of selected pictures.
5. Assessment of the stuttering severity, using the Arabic versions of stuttering severity index (A-SSI) (13), that was standardized before from the Stuttering Severity Instrument (SSI) (14,15,16) on Arabic speaking stutterers and proved to have high validity and reliability measures. Stuttering severity score of 0 to 19 was considered very mild, from 20 to 22 was considered mild, from 23 to 30 was considered moderate, from 31 to 33 was considered severe, and from 34 to 45 was considered very severe.

Application of LP therapy for the LP group:

The LP group patients were enrolled in therapy sessions using the Lidcombe Program which was translated into an Arabic handout. It was given and described in full details either to both parents or the parent involved in therapy. Discussion of all details of the program was done at the start of the program and during the whole sessions thereafter.

The therapeutic activities of the Lidcombe program were applied into two stages during 25 weeks duration as following:

Stage I (Structured therapy sessions):

These therapy sessions were carried out by the parent with the child at home, for 10-15 minutes, once or twice

daily. The parent chose a quiet setting away from distractions, and a time when the child was alert. Therapy materials were several books or toys that the child would enjoy and a token reward. The aim was to increase stutter-free utterances by praising and rewarding them.

The parent detected a daily severity rating (SR) for the child's speech. SR is a subjective scale designed for the purpose of the child's evaluation by the family at home. It is a 10 point scale judging the child's speech where 10 means very severe stuttering and 1 amounts to no stuttering. The clinician meets with parents and child once weekly in regular clinic visits, each lasted for 45 minutes, during this clinic visit:

*A single weekly SR score for each week was achieved by calculating average score out of the all daily SR scores for each week.

*As well as the clinician elicited a speech sample of 10 minutes from each child, to obtain the clinician's rating by calculating the stuttered words percentage (SW %) using the Arabic version of SSI test (13).

*Furthermore, the clinician watched while the parent gave a session to the child, as done at home.

As the child's daily SR score was steadily decreased for 3-4 day per week and maintained for another 3-5 successive weeks, the frequency of structured therapy was decreased so that after 10 weeks in average, all of the child's treatment was online therapy.

***Stage II (Online therapy):**

During this online therapy, the parents were asked to praise spontaneous stutter-free utterances of their children immediately as they occur throughout the whole daily activities, instead of praising them during the structured settings which were applied during the first stage. Online correction of stutters is also introduced by the parents to the child during a clinic session so that the child's reaction can be monitored by the clinician and the proper judgment of the parents can be evaluated. During each weekly clinic visit, both SW% and SR were estimated. As well as, self corrected stuttering were observed as trials of the child to pause briefly at stuttering times, and repeat the word fluently instead.

Once weekly clinic visits and daily home therapy continued until the clinician and parent agreed that the child's speech met one of following criteria: SW % 2 within the clinic or SR 2 outside the clinic. This criterion was achieved in average by the 25th week.

The evaluation of the control group, was done by scoring the clinician's rating (SW%), which was done at two scheduled visits; 1st week, and 25th week.

Statistical analysis:

Analysis was done using the SPSS version 10.0 under windows. Descriptive statistics were done for continuous variables by mean, standard deviation (\pm SD); and for qualitative data by number and percent. Analytical statistics were done using unpaired Student's t-test for inter-groups analysis and paired Student's t-test for intra-group analysis. p value $<$ 0.05 was considered significant (S).

Results:

Ten patients were included in this study as LP group. They were 6 boys and 4 girls. Their age ranged from 4 to 7.3 years with a mean age \pm SD of 5.9 ± 1.1 years

Clinician's rating (SW%)	LP group	Control group	P	Sign.
	Mean \pm SD	Mean \pm SD		
1 st week	27.8 \pm 11.8	30.1 \pm 9.1	$>$ 0.05	NS
25 th week	2.1 \pm 1.2	29.4 \pm 7.1	$<$ 0.001	HS

Table (1) Comparison of the first and the last clinician's rating (SW%) scores between the two groups: SW% =Stuttering word percent, SD, Standard deviation, NS = Non significant ($p >$ 0.05), HS = Highly Significant ($p <$ 0.001).

The control group included 10 patients. They were 5 boys and 5 girls with a mean age \pm SD of 5.2 ± 0.7 years. Their age ranged from 4.1 to 7.5 years.

Inter-groups analysis of the clinician's rating:

Inter-group comparison between the LP group and the control group regarding the clinician's rating at 1st week and 25th week revealed non significant difference between the mean scores of the SW% at 1st week of the two groups. On the other hand, a high significant difference was found on comparing the mean scores of the last clinician's rating done at 25th week.

Assessment scores	Occasions		P	Sign.
	Start of 1 st stage (1 st week)	End of 1 st stage (10 th week)		
	Mean \pm SD	Mean \pm SD		
Clinician's Rating (SW%)	27.8 \pm 11.8	5.1 \pm 2.8	$<$ 0.001	HS
Parent's Rating (SR)	5.0 \pm 2.5	2.5 \pm 2.1	$<$ 0.05	S

Table (2) : Comparison of the clinician and parents rating scores at the start and the end of stage (1) in the Lidcombe Program group: SW% =Stuttering word percent, SR= Severity Rating, SD, Standard deviation, S = Significant ($p <$ 0.05), HS = Highly Significant ($p <$ 0.001).

Intra-group analysis:

I. The LP group:

1. Evaluation of stage I of the LP therapy:

For statistical purpose, the 10th week in average was considered as the end of stage I of the LP. By the end of the first stage, the mean score of the clinician's ratings showed high significant reduction in comparison to the mean score of the clinician's ratings at the 1st week ($p < 0.001$). The mean score of the parent's ratings showed significant reduction (p value < 0.05) in comparison to the mean score of the parent's ratings at the 1st week (Table 2).

2. Evaluation of stage II of the LP therapy:

For statistical purpose, the 25th week in average was considered as the end of stage II of the LP. The mean scores of the clinician's ratings showed statistically significant difference ($p < 0.05$) between the last rating of stage 91) and last rating of stage (2), while no significant difference ($p > 0.05$) was noticed between both scores obtained by the parents, although a decrease in the mean value was noticed in the last parent's rating (Table 3).

Assessment scores	Occasions		P	Sign.
	End of 1st stage (10th week)	End of 2nd stage (25th week)		
	Mean ± SD	Mean ± SD		
Clinician's Rating	5.1 ± 2.8	2.1 ± 1.2	< 0.05	S
Parent's Rating	2.5 ± 2.1	1.8 ± 1.2	> 0.05	NS

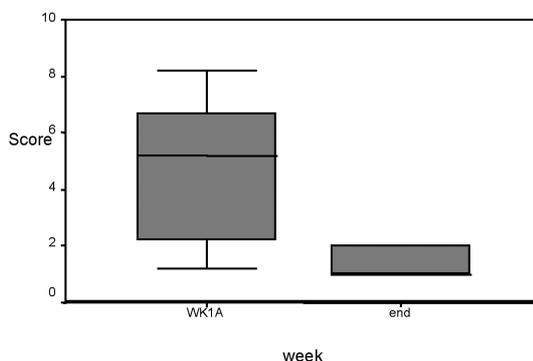
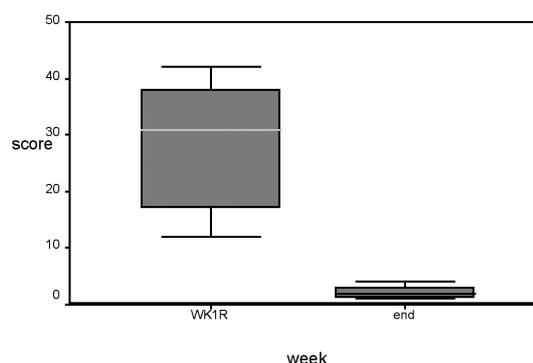
Table (3): Comparison of the clinician and parents rating scores at the end of stage (1) and stage (2) in the Lidcombe Program group: SW% =Stuttering word percent, SR= Severity Rating, SD, Standard deviation, S = Significant ($p < 0.05$), NS = Non significant ($p > 0.05$).

3. Evaluation of the LP therapy:

The mean scores of the repeated clinician and parents assessment ratings, detected from the 2nd week till the 25th week, showed reduction than those scores estimated for the 1st week. This achieved improvement started to be significant at the 5th week, and this significant value was maintained till the 25th week ($p < 0.05$). By the end of the LP (25th week) the mean of both the clinician and parents rating scores showed significant difference on comparison to the mean scores detected at the 1st week (Table 4).

Assessment scores	LP Group		P	Sign.
	Start of therapy (1 st week)	End of therapy (25 th week)		
	Mean ± SD	Mean ± SD		
Clinician's Rating(SW%)	27.8 ± 11.8	2.1 ± 1.2	< 0.05	S
Parent's Rating (SR)	5.0 ± 2.5	1.8 ± 1.2	< 0.05	S

Table (4): Comparison of the clinician and parents rating scores at the start and the end of the Lidcombe Program: SW% =Stuttering word percent, SR= Severity Rating, SD, Standard deviation, S = significant ($p < 0.05$).



Figures (1) and (2) represent the rating scores obtained by the clinicians and parents, respectively, at start and end of the therapy (after 25 weeks).

II.The control group:

The mean score of 25th week estimation of the clinician's rating showed non significant differences with the mean score of the SW% of 1st week assessment (Table 5).

Assessment score	Control Group		P	Sign.
	1st week	25 th week		
	Mean ± SD	Mean ± SD		
Clinician's score SW%)	30.1 ± 9.1	29.4 ± 7.12	>0.05	NS

Table (5): Comparison of the mean values and standard deviations (SD) of the clinician's rating assessments at first week and at 25th week of the control group: SW% =Stuttering word percent, SD, Standard deviation, NS = Non significant ($p > 0.05$).

Stuttering severity instrument scores at initial and final assessments of the two groups:

The stuttering severity instrument scores of each of the LP and control groups at 1st visit revealed that 5 patients (50%) had mild stuttering, 1 patient (10%) had moderate stuttering and 4 patients (40%) had severe stuttering. After LP therapy, 9 patients (90%) out of the LP group had mild stuttering, while only one patient (10%) had moderate stuttering. While at 25th week assessment of the control group, 3 patients (30%) remained with mild stuttering, 3 patients (30%) had moderate stuttering, and 4 patients (40%) had severe stuttering.

Discussion

Research has consistently noted that for the majority of people who stutter, the onset of disorder is preschool (17,18). The literature on therapy for younger children is considerable (19).

The Lidcombe Program (LP) was focused by Ward, 2006, as a direct operant approach to deal with stuttering, which represents a significant breakthrough in preschool stuttering therapy (2). LP does not work actively on changing motor speech patterns, but it targets the act of stuttering directly, rather than the indirect therapies which facilitate increase in fluency by changing the environment in which stuttering occurs. It induces fluency by the systematic reinforcement of fluency and the gentle punishment of stuttering rather than fluency shaping (2).

The success of LP program raises a number of interesting issues which challenge some established approaches to the treatment of early stuttering. Some studies have speculated that the success of the operant approach is related to the neural plasticity seen in younger children (2). From an organic perspective, the success of the LP is still hard to explain.

The choice of the Lidcombe Program for stutters of age 4 years who have passed 6 months duration after the onset of stuttering, in the group of children in this study was based upon consistent opinions by other researchers in many other studies. Jones et al, 2007, mentioned that stuttering usually starts in the third and fourth years of life and suggested- in agreement with Jones et al, 2000,- that a short delay in treatment of preschool stuttering, after stuttering onset does not appear to increase treatment time (20,21). The same opinion was within the preschool years before implementing the program and also to allow time for natural recovery.

This study detected that the clinician's rating has shown highly significant difference ($p < 0.001$) between the control group- who didn't receive any sessions due to their remote residence- and the LP group who received

Lidcombe Program for 25 weeks. While the LP group could achieve a mean score of SW% of 2.1 ± 1.2 by the 25th week of therapy, that showed statistically significant difference with the 1st week assessment which was had a mean of 27.8 ± 11.8 . Yet, the control group had a mean score of 29.4 ± 7.1 with non significant ($p < 0.05$) variation from their mean SW% score at 1st assessment which was 30.1 ± 9.1 .

The LP group achieved a statistically significant ($p < 0.05$) decrease in the SW% score by the 25th week of therapy. On the other hand, the control group showed a non significant ($p > 0.05$) difference of the SW% score between the 1st assessment and the 25th week assessment.

These findings indicated that Lidcombe Program helped the patient group and motivated them to follow the instructions of the technique. It seemed that when the parents learn more about stuttering they performed good monitoring of their children who provided them with better idea how to interact and converse with the child.

Also the Lidcombe Program gave the parents and children time to spend together, to talk and to exchange thought and ideas which provided the child with sense of security, assurance & power to face the external problems. This finding was similar to the work of Jones et al, 2007, in their randomized controlled trial of the Lidcombe Program groups (20). After 9 months, they found that the reduction of stuttering in the Lidcombe Program groups was significantly and clinically greater than natural recovery.

As well as, the non significant difference between the first visit and the last visit for the control group in the clinician assessment is consistent with those previously reported by Abou El-Ella et al, 2006, denoting that the control group recorded no significant improvement in any of the assessment parameters (9).

In this study the mean scores of both the clinician's and parent's ratings started to show statistically significant difference from the mean scores of the 1st week at the 5th week of therapy program. The detected significant from reduction of both % SW and SR could be correlated to the randomized samples of children with highly motivated and cooperative parents. While the average duration of stage I was considered 10 weeks, as by this week all the LP patients has achieved stable reduction of their SR scores that was maintained for another 3-5 successive weeks. This finding of the present investigation compares relatively with those previously reported by Onslow et al, 1994, who mentioned that children treated with Lidcombe Program often show improvement of stuttering within 12 weeks after the beginning of treatment (3).

This study detected that the mean score of SW% was markedly decreased from 27.8 ± 11.8 at the 1st week to 5.1 ± 2.1 by the 10th week of therapy. This finding showed more comparative reduction than that achieved by Harris et al, 2002, in their short term (12 weeks) study of 10 children treatment by Lidcombe Program⁽¹⁰⁾. They achieved reduction of from 7.9% to 3.6% which correlated to 54.4% of frequency of stuttering yet, the finding of Harris et al, 2002, indicated that Lidcombe Program is better than no treatment⁽¹⁰⁾. Moreover, the detected significant difference between the start and at the end of the 1st stage that was achieved in both the clinician's and parent's Ratings in this study, compares favorably with the findings of Rousseau et al, 2007, who found significant difference between mean pre-stage I stuttering frequency and mean post stage I stuttering frequency⁽²²⁾.

The mean scores of both of the clinician's and parent's ratings had more reduction that was maintained till the end of stage II. This achieved improvement could reach statistically significant difference only for the clinician's rating between the end of both stages, while it could not reach statistically significant difference for the parent's rating. This finding is in agreement with that of Harrison et al, 2004, however, interpretation of their data was different from the current study⁽⁷⁾. The explanation raised was that there is no preliminary evidence for the contribution of parent's severity ratings to treatment outcome⁽⁷⁾. While in this present study, these finding could be reasonably explained as the mean scores of the SR showed marked reduction by the end of stage I with a mean of SR of 2.5 ± 2.1 that was detected as statistically significant difference from the 1st week. Although the reduction of the mean scores of SR was maintained throughout the stage II, with a final mean score of 1.8 ± 1.2 , yet the weekly detected variability in the mean scores of SR was less in the second stage.

In the present study, 25th week was considered in average the end of stage II, by which this week the mean score of SW% was 2.1 ± 1.2 . The whole duration of both stage I and II in this current study seemed to be longer duration than the corresponding duration in Abou El-Ella et al, 2006, who assessed the use of Lidcombe Program in the treatment of Egyptian stuttering children, where the two stages ended after a duration of 12 weeks⁽⁹⁾. By this week they achieved a mean score of the Stuttered syllable percentage (SS%) was 16.0 ± 8.5 . Moreover, Rousseau et al, 2007, claimed that a clinician trained in the Lidcombe Program can achieve a score of SS% < 1.0% within the clinic and parent severity ratings of 1-2% in a median of 11-13 clinic visits, with the 1st stage maintained for another 3-5 visits⁽²²⁾. However, Jones

et al, 2007, found a mean frequency of SS% of 1.5% in their studied children group by the 9th month of therapy, while their studied group of children was still in the second stage of the LP⁽²⁰⁾. These variable duration and post therapy assessment scores could be explained by either the different society with different cultures and rules, or the different clinician's rating scores.

Each of the LP and control groups at the 1st assessment in the current study included 5 patients (50%) with mild stuttering, 1 patient (10%) with moderate stuttering and 4 patients (40%) with severe stuttering. Nine patients (90%) out of the LP group of this current work, had mild stuttering after the LP therapy, while only one patient (10%) had moderate stuttering. While at 25th week assessment of the control group, 3 patients (30%) remained with mild stuttering, 3 patients (30%) had moderate stuttering, and 4 patients (40%) had severe stuttering. These findings highlighted the effectiveness of the LP in comparison to spontaneous recovery. The achieved descriptive reduction of the SSI is supported by the findings of the study done by Abou El-Ella et al, 2006, who detected a statistically significant difference of the SSI in their LP group after therapy⁽⁹⁾. While they detected non significant difference of the SSI between the LP and the control groups as 60% of their LP group patients had either moderate or severe stuttering.

Finally, although the LP seemed to be effective in this work, it is worth mentioning that there were some difficulties in finding those caring parents that would carry out the home program effectively. Added to this, persuading parents to continue throughout the program and to comply for regular weekly visits till the end of stage 2 was another faced difficulty. This might explain why the LP group in this study included only 10 children. Moreover, because of the low social awareness about the stuttering problem, and the subsequent restricted selective criteria, the age of most of the children at the start of the program was relatively older than mentioned in the literature.

In Conclusion, this study supports implementing the Lidcombe Program as an intervention for stuttering as early as at preschool years for different reasons. First, although the Lidcombe Program was applied in this different social environment, the results obtained were optimistic. Second, LP has proved to be more effective than waiting for spontaneous recovery. Third, waiting for an unlimited period to see if natural recovery occurs is not acceptable, fourth, identifying these children of spontaneous recovery in advance is not possible. Finally, despite of some difficulties in selection of patients and

compliance of parents, the Lidcombe Program succeeded in treating and achieved highly significant positive results as an intervention of the young Saudi stutterers. We recommend Further long term studies including maintenance stage with detailed comparative analysis between LP therapy and other therapy approaches are recommended to be done on larger number of patients

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