

Review Paper: A Review on Evidence-Based Treatment in Phonological Interventions With Emphasis on Cycles Approach



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ABSTRACT

Introduction: Speech sounds disorders are regarded as the most significant problems among children's communication disorders. Employing the clinical experience and expertise alongside with preserving the patient's virtue, a therapeutic approach should be adopted based on valid clinical evidence. The Cycles Approach is proposed by Hodson for the treatment of moderate to severe phonological disorders. Given that the results are sometimes controversy in the field of pathology of speech and language, to ensure that time and resources are used ethically is of considerable importance. Therefore, the research studies using this approach in the treatment of speech disorder are analyzed in this review study.

Materials and Methods: The keywords of Phonology, Evidence-based Practice and Cycles Approach are chosen. Databases include Science Direct, PubMed, ASHA, and Springer. Sixteen papers were extracted from 1983 to December 2017. After the initial review, nine papers were selected for this review study.

Results: The reduction of all phonological processes as well as development of phonological awareness of the child and improvement in phonological production and phonological awareness are approved following the treatment. Production of non-irritable sounds showed a significant improvement in the succeeding group and individual combination therapy. Furthermore early intervention leads to an increase in the percentage of correct consonants as well as mean length of utterance. The Cycles Approach results in the reduction of the spelling errors patterns at phoneme, word, sentence and conversation levels.

Conclusion: Considering the research studies over the past three decades, Cycles Approach can be considered as an evidence-based treatment and the therapists can apply it as an appropriate method to interfere with the speech sound disorders in children having moderate to severe phonological disorders.

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1. Introduction

Speech sound disorders can be regarded as the most common communication disorders among preschool and school age children. The speech errors in these children can vary from mild production deficiency to numerous phoneme errors [1]. The prevalence of speech sound disorder among preschool as well as school aged children has been reported from 12.6% to 24% in European and American societies. It should be noted that this amount varies between 7.8% and 13.8% in Iran [2-5]. Utilizing the principles of evidence-based treatment and exercise can be an effective step in the professional and clinical rehabilitation of people with communication disorders. The purpose of the evidence-based practice is to integrate three principles of clinical experience and expertise, using the best available evidence and providing high-quality services along with maintaining the patient's worth and individual needs [6-9].

Choosing the treatment approach depends on many factors, namely the child's age, the type of speech sound errors, the severity of the disorder, and the amount of intelligibility of speech [10]. One of the evidence-based approaches in the treatment of speech sound disorders is the Cycles Approach. It is a type of linguistic approach and employed in the treatment of phoneme disorders for children with multiple speech sounds errors. The Cycles Approach was proposed by Hodson and aims at inefficient phoneme patterns. It is employed to train the appropriate processes of sounds [10, 11]. This approach helps in acquiring proper phoneme processes rather than eliminating phoneme processes [1]. The treatment is being scheduled for 5 to 16 weeks courses, so that during each cycle, one or more phonological patterns are targeted, and after completing each cycle, another cycle begins [12, 13].

The methods and approaches chosen by the therapists should always be reviewed and evaluated in terms of being scientific and evidence-based. Citation to the research studies to confirm the efficacy of therapeutic effect is one of the ways of choosing the best and closest therapeutic approach in accordance with the patients' conditions [6, 8]. Considering that research in the field of phonological acquisition is one of the main components of the Cycle Approach, along with the two principles of developmental phonology and cognitive psychology, the research conducted by this approach in the treatment of speech sound disorder is studied in this review study [11]. Since the result of interventions are sometimes unclear in the field of speech and language pathology, to

ensure that time and resources are used ethically is of considerable importance [14].

2. Materials and Methods

This study was conducted to investigate the evidence-based treatment of speech sound disorders on the basis of Cycles Approach and reviewed the studies conducted in this area. The keywords of Phonology, Evidence-Based Practice (EBP) and Cycles Approach are chosen. Databases include Science Direct, PubMed, ASHA, and Springer. The papers were extracted from 1983 to December 2017. A number of 16 papers were extracted from these databases and after the initial review; nine papers were selected for this review study. Inclusion criterion was using Cycles Approach in interventions or studies, so that seven articles were excluded.

3. Results

Following the presentation of Hodson Cycles Approach and using this approach in the research study, Taylor and colleagues examined 4 children aged 3:1 to 5:1 years with moderate to severe phonological disorders and healthy linguistic characteristics. In this descriptive study, the two therapeutic approaches namely the Cycles Approach and Minimal Pairs were compared. Treatment method was at the level of the word and sentence and auditory bombardment without amplification. Comparing to children who received treatment with Minimal Pairs Approach, those who received Cycles Approach therapy showed more progress in terms of phonological processes and proper production of phonemes [15]. Montgomery examined 9 children aged between 3:1 and 4:10 years with moderate to severe phonological disorders. This descriptive study made use of only the Cycles Approach as the treatment and a significant improvement in phonological production was achieved. The findings of the study was also significant in group therapy [16]. Moreover, Almost et al. conducted a study on the effect of speech interventions on phonological disorders. In this randomized controlled trial, a number of 30 children aged between 2:9 and 5:10 years with severe phonological dysfunctions under phonological treatment by Cycles Approach compared with other approaches. This study showed that immediate intervention led to an increase in Percentage of Consonants Correct (PCC) and Mean Length of Utterance (MLU). In this experiment, it was revealed that employing Cycles Approach results in the reduction of spelling error patterns at phoneme, word, sentence and conversation levels [17]. Applying Cycles Approach as well as Script Approach for intervention, Tyler et al. studied 12 children 3:7 to 5:7 years old with

Table 1. Cycles approach studies

Author(s)/ Year of Study	Approach & Participants	Study Design	Objective(s)	Results
Alfonso et al., 2015 [13]	A 6-year-old child with moderate phonological disorder	A longitudinal study	The effect of cycles-based treatment on phonological error patterns and phonological awareness skills	Decrease in all phonemic processes and increase in child's phonological awareness, but the PCC improved in a small number of phonological errors patterns.
Rudolph and Went , 2014 [21]	It was performed on three children from 4: 3 to 5: 3 years old having moderate to severe speech disorder.	A longitudinal study	The effectiveness of Cycles Approach in interventions of children with phonological disorder	Two children had a significant recovery at the end of the intervention, and the third child showed positive effect in reducing phonological errors during the post-treatment follow-up program.
Gillon et al., 2005 [19]	A longitudinal study was performed on 12 children 3: 0 to 3:11 years old with moderate to severe speech disorder.	A longitudinal pre and post-control group design	The use of the Cycles Approach, along with phonological awareness training and sound knowledge training	Progress in phonological production and phonological awareness after treatment
Stoel-Gammon et al., 2002 [12]	A 4-year-old child with a severe phonological disorder, a case study	A longitudinal study	The use of the Cycles Approach	Enhancing in phonological system, good intelligibility, and only mild articulation errors
Rvachew et al., 1999 [20]	Ten children with a mean age of 4: 6 year and 13 children with a mean age of 4:7 year with moderate to severe phonological disorder without other language disorders	A descriptive study	Two types of group and individual treatment using the Cycles Approach	Following a combination of group and individual treatment, the production of non-irritable sounds revealed a significant improvement while this improvement was not seen in purely group therapy format.
Almost et al., 1998 [17]	A number of 30 children aged between 2: 9 to 5:10 years with severe phonological dysfunctions under phonological treatment by Cycles Approach compared with other approaches	Randomized control trial; immediate vs. delayed treatment	The effect of speech interventions on phonological disorders	Immediate intervention led to an increase in Percentage of Consonants Correct (PCC) and Mean Length of Utterance (MLU). Cycles Approach results in the reduction of spelling error patterns at phoneme, word, sentence and conversation levels.
Tyler et al., 1991 [18]	Study on 12 children 3:7 to 5:7 years old having phonological and linguistic disorders, applying Cycles Approach as well as Script Approach for intervention	Modified pre-and post-test control group design	Treatment of phonological disorders based on Cycles Approach as well as Script Approach	In the treatment based on Cycles Approach, the Percentage of Consonants Correct increased. No positive effect was detected on the use of the Script Approach.
Montgomery et al., 1989 [16]	Nine children aged between 3: 1 to 4: 10 years having moderate to severe phonological disorders were studied. This study used only the Cycles Approach as the treatment	A descriptive study	Phonological intervention in children having phonological disorders at preschool age	Improvement in phonological production was significant. The findings of the study was also significant in group therapy.
Tyler et al., 1987 [15]	Four children aged between 3:1 to 5:1 years having moderate to severe phonological disorders with healthy linguistic characteristics	A descriptive study	In this study, the two therapeutic approaches namely Cycles Approach and Minimal Pairs were compared.	Comparing to children who received treatment with Minimal Pairs Approach, those who received Cycles Approach therapy showed more progress in terms of phonological processes and proper production of phonemes.

phonological and linguistic disorders. The results of the study indicate that the group received the treatment based on Cycles Approach had an increase in their PCC and no positive effect was detected on the use of the Script Approach in the other group [18].

The use of the Cycles Approach along with phonological awareness training and sound knowledge training, was examined by Gillon. This longitudinal study was performed on 12 children aged 3:0 to 3:11 years with moderate to severe speech disorder. The control group consisted of 19 children with mean age of 3:9 year without any language disorders. The results of this study showed progress in phonological production and phonological awareness after treatment [19]. A four-year-old child with a severe phonological disorder was intervened by using of the Cycles Approach. The study was performed by Stoel-Gammon. This case demonstrated receptive language skills within normal limits, but his expressive skills appeared low and were difficult to measure because of severe unintelligibility. He received treatment two times per week. Sessions consisted of new phonological patterns along with auditory bombardment at the beginning and end of each session of a variety of activities to establish and practice. Phonological processes treatment had lasted more than 2 years, during that time he changed from being a preschooler with a severe phonological disorder to a school-age child with a well-established phonological system, good intelligibility, and only mild articulation errors [12]. Rvachew and colleagues examined two types of group and individual treatment using the Cycles Approach in a descriptive study. Ten children with a mean age of 4: 6 year and 13 children with a mean age of 4:7 year with moderate to severe phonological disorder without other language disorders were examined and treated. Following a combination of group and individual treatment, the production of non-irritable sounds revealed a significant improvement while this improvement was not seen in purely group therapy format [20].

Rudolph and Went reviewed the effectiveness of Cycles Approach in interventions of children with phonological disorder. This longitudinal study was performed on three children having moderate to severe speech disorder from 4:3 to 5:3 years old. Two children had a significant recovery at the end of the intervention, and the third child showed positive effect in reducing phonological errors during the post-treatment follow-up program [21]. Alfonso et al. also examined the effect of cycles-based treatment on phonological error patterns and phonological awareness skills. A 6-year-old child with moderate phonological disorder was examined in this longitudinal

study. The treatment was performed in three cycles of 45 minutes each week through Cycles Approach. The results included the decrease of all phonemic processes and increase of child's phonological awareness, but the percentage of correct consonants improved in a small number of phonological errors patterns [13] (Table 1).

4. Discussion

In evidence-based treatment, using the best treatment approach is one of the basic principles with undeniable importance [22]. For the speech-language pathologist, the main challenge in the treatment of moderate to severe speech disorder is deciding on the treatment approach and achieving the optimal verbal and linguistic goals [23]. Studies have shown that the use of Cycles Approach in the treatment of speech sounds disorders in case of early intervention has the greatest impact on the PCC and MLU and leads to an increase in the level of these two components. On the other hand, Cycles Approach along with other approaches, such as sound training and phonological training, increases PCC and MLU, improves phonological production and phonological awareness. Based on this approach, applying combined group therapy and individual therapy can increase the effectiveness of the treatment of irresistible sounds more than ever. This approach in addition to its immediate effectiveness, in some cases results in progress in speech sounds at the following-up phase. Studies have demonstrated the simultaneous impact of this approach on increasing the percentage of correct consonants and improvements in phonological awareness, but in some cases, only the phonological awareness improves and the percentage of correct consonants does not show any significant increase. This different result might be related to the children age or intervention period. The changes mainly appear at the phoneme levels, words and sentences. The children benefited from this therapeutic approach have also shown an improvement in the correct production of speech sounds in the context of the conversation. Moreover, evidence suggests that this approach is not only effective in children with severe phonological disturbances, but also in children with a combination of other language disorders. Immediate intervention is regarded as one of the important points in this approach. The younger the child at the time of intervention, the more speech sounds are corrected. It seems that better results in phonological awareness and sound correction is based on considering the child age and severity of disorder in intervention. However, the therapists should be aware of their own limitations of knowledge, studies, as well as experience. With regard to implementing the

Cycles Approach, the therapists are supposed to consider the extent of their clinical expertise on the one hand, and to pay attention to the priorities and requirements of the clients on the other hand. Considering the research studies over the past three decades, Cycles Approach can be considered as an evidence-based treatment that speech-language pathologists can employ it for treating speech sound disorders with considerable assurance. It is worth to mention that the studies conducted in this area as well as the examined samples were very limited and a considerable number of them are descriptive. Only one study was conducted regarding the effectiveness of this approach. Therefore, more extensive studies are needed to determine the effectiveness of this approach.

Ethical Considerations

Compliance with ethical guideline

Our work was a review study of some papers. It is not an original article and is not based on research grant or thesis. So we have regarded to ethical consideration.

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Conflict of interest

Authors have no conflict of interest.

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