

Fluency Disorders and Maladaptive Behaviours: A Comprehensive Investigation and Rehabilitation Strategies

Kiruthiga E, G. Christopher*

Department of English, School of Social Sciences and Languages, Vellore Institute of Technology, Vellore, India

Received December 26, 2023; Revised March 7, 2024; Accepted March 20, 2024

Cite This Paper in the Following Citation Styles

(a): [1] Kiruthiga E, G. Christopher, "Fluency Disorders and Maladaptive Behaviours: A Comprehensive Investigation and Rehabilitation Strategies," *Universal Journal of Public Health*, Vol. 12, No. 2, pp. 240 - 249, 2024. DOI: 10.13189/ujph.2024.120207.

(b): Kiruthiga E, G. Christopher (2024). *Fluency Disorders and Maladaptive Behaviours: A Comprehensive Investigation and Rehabilitation Strategies*. *Universal Journal of Public Health*, 12(2), 240 - 249. DOI: 10.13189/ujph.2024.120207.

Copyright©2024 by authors, all rights reserved. Authors agree that this article remains permanently open access under the terms of the Creative Commons Attribution License 4.0 International License

Abstract Fluency is essential for effective and precise communication. It refers to the effortless nature of speech, encompassing language and speech functioning. Fluency disorders, like stuttering and cluttering, disrupt communication and affect anyone, regardless of age, gender, or background. Genetics and environmental factors can disrupt the development of speech and language fluency, which leads to fluency disorder. Therefore, it is crucial to identify and address these factors in order to improve speech fluency. People with fluency disorders tend to develop negative conditioning, resulting in unhelpful thinking and avoidance behaviours. This research follows a qualitative methodology and draws on various secondary sources, including current medical research publications, psychology research papers, case studies, and medical blogs. The article focuses on fluency disorders such as stuttering and cluttering, discussing available treatment options and strategies for managing these disorders. Stuttering is a fluency disorder that disrupts speech flow and rhythm, causing repetitions or blocks. It is the most common type and affects social, emotional, and academic functioning of an individual. There are three primary forms: developmental, neurogenic, and psychogenic. Genetic factors, neurophysiological differences, and neurochemical imbalances contribute to stuttering. Cluttering is characterized by a fast or irregular speech rate, leading to disorganized speech that is difficult to understand. This condition may also impair word finding and thought organization. Treatment options include

fluency-shaping therapy, stuttering modification therapy, cognitive-behavioural therapy (CBT), mindfulness-based approaches, and pharmacotherapy. Mobile applications are becoming popular tools for managing fluency disorders. The study's findings indicate that early intervention, recovery therapies, and rehabilitation strategies remain crucial in treating fluency disorders, and they can significantly improve an individual's quality of life. This article contributes a comprehensive analysis of fluency disorders and its psychological aspects in the field of human healthcare and development.

Keywords Anxiety, Avoidance Behaviour, Cluttering, Rehabilitation, Stuttering

1. Introduction

“The term fluency is used to describe speech that is effortless in nature” [1]. There are two kinds of fluency which are viewed as language functioning and speech functioning. “The act of speaking fluently is dependent on the integration of both the language and speech motor process” [2]. Language fluency can be defined as the ease, confidence, and accuracy with which learners use the target language in various contexts [3]. Language users interact through social activities to convey their goals and ideas to peers [4]. It involves clear communication, understanding

of others, and proper use of grammar and vocabulary. Speech fluency, on the other hand, specifically relates to the smoothness, rhythm, and flow of speech production [2]. It also includes the qualities of naturalness and spontaneity of speech, as well as the ability to speak without interruptions or hesitations. Stark weather states fluency as “non-stuttered and forward-moving speech in regards to both content and production” [5]. Speech fluency is a multifaceted concept that includes several dimensions. Continuity, rate, rhythm, effort, naturalness, talkativeness, and stability are all critical aspects that contribute to a speaker's fluency. A fluent speaker can communicate without pauses, hesitations, or interruptions, ensuring continuity in their speech [2]. They can also speak at a comfortable pace that is neither fast nor slow, maintaining an appropriate rate. The flow and structure of speech are referred to as rhythm, and a fluent speaker can maintain a natural pitch, stress, and intonation rhythm. Effort is another dimension of fluency; a person who speaks fluently does so easily and without stress. Naturalness is a related concept that describes how effortless and authentic a speaker's speech sounds. Talkativeness is yet another dimension of fluency, and it refers to the amount of speech produced [6]. A proficient speaker has an adequate vocabulary that is neither insufficient nor excessive. Finally, a fluent speaker can adapt to different situations, maintaining stability in their speech over time. Together, these dimensions create a comprehensive picture of fluency in speech. Any disruption of these fluency dimensions can result in fluency disorder.

2. Disorders of Fluency

Fluency disorders encompass a range of speech disorders that can cause disruptions in a person's ability to communicate effectively [7]. These disorders can affect anyone, regardless of their age, gender, or background. They are primarily characterized by disruptions in the typical rhythm and flow of speech, which can manifest as word or sound blocks, prolongations, or repetitions. These disruptions can occur at any point during the speech process, from initiation to completion. For instance, a person may experience difficulty starting or finishing a sentence. These disruptions can significantly impact a person's ability to communicate and may result in psychological distress. Fluency disorders can vary in severity, with some people experiencing occasional interruptions in their speech flow, while others struggle to convey even basic information [7,8]. Additionally, the frequency and duration of speech difficulties can vary, with some people experiencing symptoms constantly and others only in specific situations such as public speaking or speaking with strangers.

Fluency disorders can present unique challenges for individuals, and it's essential to acknowledge the varying degrees of severity and psychological impacts they can

have [9]. It is crucial for individuals to be aware of fluency disorders and to seek early intervention once they identify the disorder. People who stutter may experience psychological issues due to the negative environment they live in [10]. For instance, their own speech may embarrass themselves and their family members and, at times, people may feel uncomfortable with their speech and even mock or ridicule them. However, speech-language pathologists can provide valuable support to individuals experiencing speech difficulties. By working together, individuals can improve their communication skills and overall quality of life. With the right treatment, it's possible to overcome the psychological effects of fluency disorders, such as anxiety, depression, or embarrassment.

2.1. Research Questions

1. What is the relationship between avoidance behaviour and fluency disorder, and what are the effective ways to rectify it?
2. What are the effects of rehabilitation strategies to reduce stuttering and cluttering?

3. Research Methodology

This study used a qualitative research methodology, including exploratory analysis, to raise awareness about the condition and investigate the effects of rehabilitation strategies. To gather information, researchers examined research publications from online databases like Web of Science, PubMed, National Institute of Health, Academia, and Scopus. This method examined the journal articles and books to develop a deep understanding of stuttering and cluttering. Case studies related to maladaptive behaviour were gathered from journal articles. The researchers used textual interpretation to examine the potential risks associated with fluency disorders.

4. Types of Fluency Disorders

There are two types of fluency disorders. They are stuttering and cluttering.

4.1. Stuttering

Stuttering is a fluency disorder that affects a person's ability to speak smoothly [11]. It is characterized by involuntary interruptions in the flow and rhythm of speech, which can cause repetitions, prolongations, or blocks of sounds, syllables, words, or phrases. The severity of stuttering can differ from person to person and can affect their social, emotional, and academic functioning [12]. Stuttering is the most common type of fluency disorder. There are three primary forms of stuttering that have been identified through various studies. These include

developmental, neurogenic, and psychogenic stuttering.

The most common type of stuttering is developmental stuttering, which usually develops during childhood, typically between the ages of 2 and 5 [2]. It is a condition that arises when young children are learning to talk but do not yet have the speech and language skills required to express themselves through speech. Children experiencing developmental stuttering may repeat sounds, syllables, or words or extend word sounds, causing their speech pattern to be prolonged or stretched out [13]. Stuttering may be triggered by stress, anxiety, or excitement. Most children who experience developmental stuttering recover within a few years of experiencing the symptoms. Furthermore, it has been observed that developmental stuttering tends to run in families.

Neurogenic stuttering is a condition caused by abnormalities in the signalling between the brain and the nerve fibres and muscles that control speech [14]. This type of stuttering is a result of structural damage in the motor speech area of the brain [15]. It usually occurs due to neurological conditions that affect the brain, such as brain injury, stroke, or other disorders. Neurogenic stuttering makes it difficult for individuals to initiate speech, leading to repetitions or blocks of sounds or syllables [16]. It can occur suddenly after a brain injury, or it can gradually develop over time in people with degenerative neurological conditions.

Psychogenic stuttering is a type of stuttering that is caused by stress, anxiety, or trauma [17]. People who suffer from this condition may have difficulty speaking fluently due to emotional or psychological strain. The exact cause of psychogenic stuttering is not well understood, but it is also believed to be a combination of genetic and environmental factors [18,19]. Stuttering can be caused by genetics, environment, and brain function. It can take different forms and present in different ways. With the proper support, those who stutter can learn to communicate confidently.

Stuttering is caused by a condition that affects the ease and flow of speech. According to some studies, stuttering may be caused by changes in the way the brain processes language [20,21]. However, other research suggests that there is a link between stuttering severity and psychological factors such as anxiety or stress [22,23].

Genetic factors are believed to be a significant cause of stuttering, as research has shown that the condition often runs in families [24,25]. The exact genes that cause stuttering are still not fully understood, but multiple genetic variants have been identified that may be connected to the disorder. Neurophysiological factors, such as differences in brain structure and function, can also contribute to stuttering [26]. These differences can affect the timing and coordination of speech movements, leading to the development of stuttering. Additionally, researchers have found that stuttering can be linked to neurochemical imbalances, such as abnormalities in serotonin and dopamine levels.

Environmental factors can also play a role in the development of stuttering [27]. Stressful life events, traumatic experiences, and anxiety have been shown to increase the likelihood of developing stuttering. For example, the loss of a loved one, a job, or going through a divorce can trigger stuttering. Traumatic experiences, such as mental or physical abuse, can also cause stuttering [28]. Emotional factors like anxiety can make stuttering symptoms worse, making it harder to speak fluently.

Developmental delays or neurological conditions, like cerebral palsy or traumatic brain injury, can also lead to stuttering in some individuals [29]. It is important to remember that stuttering is not a result of a person's intelligence, personality, or upbringing. Understanding the causes of stuttering can help improve the effectiveness of treatments and interventions.

Stuttering can manifest itself in various ways such as repetition, prolongation, or blocks of sounds, syllables, or words. Apart from these symptoms, individuals may experience physical tension, anxiety, and a desire to avoid certain words or situations. People who struggle to communicate effectively due to stuttering may feel embarrassed, frustrated, or ashamed, which can significantly impact their self-esteem and confidence [30]. Additionally, they may face social isolation and difficulties in forming relationships as others may not understand their speech difficulties. Fortunately, individuals with stuttering issues can learn techniques to improve their fluency and manage their speech disorders with the right therapy and support. Various treatment options, including speech therapy, cognitive-behavioural therapy, and medication, are available, and a skilled healthcare provider can help determine which approach is best suited to an individual's needs [29].

4.2. Cluttering

Cluttering is a fluency disorder that affects communication, although it is often mistaken for stuttering. Stuttering is a distinct disorder with its own symptoms [31]. Cluttering is identified by a fast or irregular speech rate, with a tendency to speak too much and too quickly [32]. This can lead to disorganized speech that is difficult to follow, making it challenging to understand for others. Neurological condition that impedes the person's ability to process speech effectively. This condition can be triggered by various factors, such as genetic predisposition, environmental stress and anxiety, and developmental disorders like attention-deficit/ hyperactivity disorder (ADHD) [33].

In general, the following are some of the symptoms that are associated with cluttering, although they can vary from person to person.

4.2.1. Rapid or Irregular Speech Rate

People who have cluttering as a fluency disorder often talk very fast and find it difficult to regulate their speed of

speech [34]. They might combine words and repeat certain phrases frequently. If they speak quickly or unevenly, the listeners may have trouble comprehending them.

4.2.2. Articulation Difficulties

Cluttering can impede communication, causing slurred speech, incorrect pronunciations, and difficulty with certain sounds [35]. This can lead to frustration and misunderstandings for both the individual and those trying to understand them.

4.2.3. Difficulty in Organizing Thoughts and Ideas

Individuals who clutter may face difficulty in organizing their thoughts and ideas, which can result in disorganized and fragmented speech [36]. As a result, it could be difficult for others to follow their line of reasoning, and their communication may become less coherent. Moreover, individuals with cluttering may find it challenging to locate the appropriate words or phrases to express their thoughts, thereby adding to the confusion and difficulties in understanding their speech. This way, cluttering can significantly impact an individual's ability to communicate effectively.

4.2.4. Omission or Addition of Words or Phrases

People who clutter their speech tend to unconsciously add or remove words or phrases, which can lead to misunderstandings and disagreements [37]. This can be a source of frustration for both the speaker and the listener, as important information may be left out or irrelevant details may be included. Furthermore, the need for constant clarification can significantly slow down conversations and impede effective communication. To overcome this, clutterers should strive for self-awareness and consider seeking therapy or other strategies to improve their communication skills and reduce the impact of their speech-related tendencies [38].

4.2.5. Repetition of Words or Phrases

People who have cluttered speech patterns tend to repeat words or phrases several times in a row, which can interrupt the flow of conversation and make it challenging for listeners to comprehend the intended message [39]. As a result, mutual confusion may arise. Clutterers can benefit from speech therapy that focuses on reducing repetition and improving communication skills [38]. By being aware of their speech patterns and practicing effective communication techniques, they can better express their ideas and thoughts.

4.2.6. Difficulty in Maintaining a Clear and Concise Message

Individuals who are disorganized and have cluttered thoughts may find it difficult to communicate their ideas and thoughts in a clear and effective manner [40]. Their speech may be chaotic, repetitive, and confusing to the listener, which could lead to misunderstandings. This

inability to communicate effectively can be frustrating and isolating in both personal and professional settings.

4.2.7. Lack of Awareness of Speech Difficulties

Individuals with cluttering may be unaware of their speech difficulties, making it difficult for them to seek help [37]. Individuals may continue to struggle with communication and face the negative consequences that come along with it if they do not recognize that they have a problem with cluttering. Furthermore, they need more awareness to receive appropriate treatment or support, which might reduce the difficulties they have experienced. People who struggle with cluttering should make it a priority to raise their level of awareness and seek the assistance of professionals to enhance their ability to communicate and overall quality of life with cluttering [41].

4.2.8. Difficulty in Social Communication

Clutter can make it difficult for individuals to engage in social communication, leading to feelings of social isolation and anxiety [42]. People with cluttering may require assistance in communicating and maintaining conversations, which can result in misunderstandings and exclusion. As a result, individuals may face challenges in connecting with others, leading to social communication issues causing isolation and anxiety. Clutterers can enhance their quality of life by cultivating positive relationships, reducing social stress through professional help, and improving their communication skills.

It's important to understand that cluttering, a fluency disorder, can have a significant impact on personal, academic, and professional life [43]. It can also affect communication with others. For a person experiencing clutter, seeking professional assistance from a speech-language pathologist is critical for diagnosis and treatment. Treatment may include techniques from speech therapy, such as slowing down the speech rate, organizing thoughts, and increasing awareness of speech difficulties.

5. Diagnosis

Stuttering is typically diagnosed by a certified speech-language pathologist (SLP). The diagnosis involves direct observation of an individual and a review of their case history. The SLP will take into account factors such as age, frequency of stuttering, and any disabilities or other conditions that may be present [44]. To gather a case history, the SLP may conduct interviews or conversations with parents, observe interactions between parents and children, and analyze the speech patterns of the child's parents [45]. The goal is to identify speech disfluency and determine its severity. During direct observation, the SLP will assess speech for various factors including disfluency types, frequency, duration, speaking rate, naturalness, fluency, and physical concomitants [46]. The stuttering prediction instrument for young children can also be used

to assess stuttering severity and predict its course. In addition to these assessments, common investigations may include anxiety, attitudes, self-perceptions, quality of life, behaviours, and mental health. People with clutter often have reading and writing disabilities, especially disorderly handwriting, and may be misdiagnosed with language disorders, learning disabilities, or ADHD [47].

6. Prevailing Treatments for Fluency Disorders

Many people around the world struggle with fluency disorders, which can make it difficult for them to communicate effectively [48]. As a result, individuals who suffer from these disorders often experience social isolation, low self-esteem, and anxiety. It is essential to treat fluency disorders to improve the quality of life for those affected. With proper treatment, individuals can acquire the necessary skills to manage their fluency disorder, enhancing their confidence and communication ability.

6.1. Fluency-Shaping Therapy

Fluency shaping therapy helps individuals who stutter to speak more fluently by controlling their breathing, phonation, and articulation [49]. This therapy uses operational conditioning techniques and involves training individuals to reduce their speaking rate by stretching vowels and consonants, using continuous airflow, and speaking softly [7]. The goal is to improve the individual's communication skills, resulting in slow but fluent speech, which is helpful in a clinical setting. However, some people criticize the lack of naturalness in speech following treatment. Fluency-shaping strategies are usually taught in intensive group therapy programs lasting two to three weeks. This therapy is frequently used to treat mild to severe fluency issues. Rifaie created a fluency-shaping program for stuttering, incorporating cognitive therapy. Along with his colleagues, Rifaie administered the program to 100 Arabic-speaking individuals between the ages of 8 and 20, who were divided into a control group and a study group. The study group achieved greater fluency and improved self-perception, showing the program's effectiveness in stuttering rehabilitation [50].

6.2. Stuttering Modification Therapy

Stuttering modification therapy is a behavioural treatment aimed at reducing the severity of stuttering [51]. Unlike fluency-shaping therapy, it doesn't focus on producing fluent speech. Instead, it concentrates on modifying behaviours linked to stuttering, like repetitions, prolongations, and blocks. Modification therapy is also used to treat stuttering disorders that range from mild to severe. To assist those who stutter, this sort of therapy often

includes strategies such as easy onset, mild voice onset, and light articulatory contacts. It also seeks to boost overall communication skills and confidence in public speaking settings. Rachel and Peter conducted an experiment using stuttering modification therapy for nine individuals. Their study found that stuttering modification therapy improved communicative confidence and speech skills for all but one participant. Three individuals experienced a decline in stuttering severity, while five had mild stutters. Most participants reported a reduced impact of stuttering and a positive shift in thinking, feeling, and behaviour after therapy [52].

6.3. Cognitive-Behavioural Therapy

Cognitive-behavioural therapy (CBT) is a form of psychotherapy that aims to modify unhelpful patterns of thought and behaviour [53]. This therapy can be effective in treating anxiety by helping individuals recognize negative beliefs and replacing them with more positive ones. Attentional training, cognitive restructuring, and behavioural experiments are the primary techniques used in CBT. Attentional training involves developing skills to focus on actions, words, feelings, and surroundings. Cognitive restructuring involves identifying and correcting cognitive errors that lead to negative thoughts [54]. Behavioural experiments can be used to teach strategies to manage negative feelings associated with stuttering. CBT may also incorporate cognitive interventions and a dysfunctional thought record scheme to help clients change their cognitive distortions by practicing alternative behaviours [53]. Participants in cognitive interventions identify and modify cognitive distortions, examine facts, list alternatives, and expand perspectives. The goal of CBT is to assist clients in changing their negative thought patterns and behaviours to positive, functional, and realistic approaches [55]. A study evaluated the efficacy of a CBT program in reducing speech anxiety among adolescents with stuttering. The program substantially decreased speech anxiety compared to the control group. This intervention can be useful for speech educators and therapists in treating speech anxiety [56].

6.4. Mindfulness-Based Approaches

Mindfulness-based approaches, which combine meditation techniques with cognitive-behavioural therapy, can help reduce anxiety and stress associated with fluency disorders [57]. Some of the mindfulness based approaches are, Mindfulness-based cognitive therapy, Mindfulness-based stress reduction and acceptance and commitment therapy. These approaches aim to increase self-awareness and acceptance by making individuals more conscious of their thoughts and feelings. It also allows learners to develop positive attitudes towards communication, social interaction and reduces negative emotions. Researchers found that mindfulness-based intervention helped reduce

stuttering and anxiety in two cases. The techniques used included behavioural exposure, emotion regulation, changes in thought perceptions, increased sensory-perceptual processing, attentional control, and acceptance. The results were significant, with sustained therapeutic gains over a year. The study suggests that mindfulness based programs could be a valuable complement to existing treatments for stuttering [58]. Mindfulness-based approaches can be used as a standalone therapy or in combination with other treatment methods.

6.5. Pharmacotherapy

One way of addressing fluency disorders is through pharmacotherapy, which uses medication. This method is often used in combination with other treatment approaches. Medicines such as anti-anxiety drugs, antidepressants, and antipsychotics may help in managing anxiety and other symptoms associated with fluency disorders [59]. In addition to medication, speech therapy is a popular treatment option for fluency issues. Speech therapists help people enhance their speech production and minimize disfluencies. Breathing exercises, relaxation measures, and speech modulation techniques may be included. Individuals with fluency issues can benefit from thorough and personalized treatment that combines medication and speech therapy to improve their fluency skills.

6.6. Electronic Fluency Devices

Individuals who experience fluency disorders can benefit from using an electronic fluency device [60]. There are two types of such devices: computerized feedback devices and Altered Auditory Feedback (AAF) devices [61]. Computerized feedback devices aid in controlling breathing and sound production. AAF devices alter speech signals to change how speakers perceive their voices. A variety of AAF devices, including singing, choral speaking, masking, and delayed or frequency-alternative feedback, have proven effective in reducing stuttering. However, the effects of AAF devices are highly individualistic. While some individuals achieve significant fluency with such treatments, others receive little to no benefit from them.

6.7. Mobile Applications

The management of fluency disorders is gaining popularity, and mobile applications are becoming popular tools [62]. These apps provide speech exercises, self-monitoring, coaching, and other services. The most common methods used for stutter correction are Masking Auditory Feedback (MAF), Delayed Auditory Feedback (DAF), Frequency-shifted Auditory Feedback (FAF), metronomes and tempo correctors (Rhythmic metronome strikes), and visual feedback [63]. Michele and her colleagues utilized electronic fluency devices to assist individuals with moderate and severe stuttering. The delayed auditory feedback feature helped the severe

stuttering group with speech fluency. The masked and amplified auditory feedback conditions also reduced stuttering-like disfluencies for both groups. Ultimately, both groups experienced spontaneous speech benefits from these interventions [64].

Fluency disorders can significantly reduce an individual's quality of life. However, there are many strategies available for managing this condition. To determine the most appropriate treatment approach, it is essential to seek the advice of a professional.

7. Suggestions and Recommendations for Rehabilitation

Stuttering can cause psychological issues due to negative social reactions such as embarrassment, discomfort, and ridicule. This negative conditioning can lead to a loss of self-confidence and self-esteem in the stutterer, resulting in unhelpful thinking [65]. Over time, the avoidance response of the stutterer can become conditioned into a fear that may be difficult to change. As a result of these incidents, they may struggle to cope with treatment. Managing fluency problems, such as stuttering and cluttering, can be challenging and can cause cognitive and psychological issues that lower the quality of life. The treatment of fluency disorders requires therapies from the Speech Language Pathologists and the implementation of various rehabilitation strategies that address both cognitive and emotional challenges [66]. These strategies include early intervention, family support, self-help techniques, support groups, and coping mechanisms [67].

7.1. Early Intervention

Timely identification and intervention are essential in the effective treatment of individuals with fluency disorders. Seeking professional assistance is strongly recommended once stuttering behaviours are observed to prevent the development of negative feelings and behaviours commonly associated with stuttering. Early intervention can assist individuals in developing communication skills and effective strategies to manage their stuttering, which can prove to be beneficial in the long term [68]. The use of speech therapy, counselling, and other interventions can help individuals learn techniques to improve their speech fluency. Early intervention measures can be critical to the success of such interventions.

7.2. Family Support

Individuals who suffer from fluency disorders require the support of their families to manage their stuttering [69]. In order to help individuals develop communication skills and strategies to manage stuttering, family members can offer emotional support and assistance. Furthermore, they can assist in practicing communication skills in everyday

situations. It is essential for family members to gain knowledge about the impact of stuttering on the life of their loved one and offer support in a patient, non-judgmental, and empathetic manner.

7.3. Self-Help Strategies

Individuals who experience difficulty in speaking fluently due to fluency disorders such as stuttering and cluttering, can develop self-help strategies to manage their condition [68,70]. Breathing exercises, relaxation techniques, and various speech exercises are examples of techniques that can be included in these strategies. With the help of these techniques, stuttering can be managed, and spoken fluency can be improved, which can be extremely beneficial for individuals [71]. To develop effective self-help strategies that are tailored to the specific needs of an individual, it is essential to collaborate with a speech-language pathologist.

7.4. Support Groups

Support groups represent a worthwhile resource for individuals struggling with fluency disorders [68,72]. By participating in such groups, individuals can benefit from a secure and encouraging setting that allows them to share their experiences and gain insights from others. Moreover, such groups can provide individuals with emotional support and encouragement, helping them better manage their stuttering. Individuals need to prioritize locating the support group that is most suitable for their requirements, irrespective of whether the group is conducted in person or online [11]. This will enable them to maximize the potential value of the support group experience, ensuring they can reap the benefits of this valuable resource.

7.5. Coping Mechanisms

Individuals suffering from fluency disorders may benefit from the use of coping mechanisms [73]. Positive self-talk, mindfulness, and cognitive-behavioural therapy are such mechanisms that can be employed. These techniques can help individuals manage their emotions and develop effective coping strategies to address their stuttering [74]. To create effective coping mechanisms, collaborating with a mental health professional is essential. These interventions can significantly assist individuals experiencing stuttering and communication difficulties, although tailored and personalized strategies are necessary to produce optimal outcomes. Collaboration with a speech-language pathologist and mental health professional is recommended to ensure the development of effective strategies [75]. By doing so, individuals with fluency disorders can improve their communication abilities and overcome their challenges.

8. Limitations of the Study

This research only focused on reviewing the experimental and case studies journal articles and books that are associated with the fluency disorders and maladaptive behaviours. This research aims to analyze the impact of diagnosis, prevailing treatments and rehabilitation strategies to overcome fluency disorders. This research paper is solely based on textual analysis of secondary source material; no case studies, interviews, or quantitative methods were used.

9. Conclusions

Fluency disorders can have a significant impact on a person's ability to communicate effectively, which can lead to psychological distress. Stuttering and cluttering are the two main types of fluency disorders that affect people of all ages, genders, and backgrounds. Early intervention can be an effective way to reduce speech fluency disorder or stuttering in children. Unfortunately, some children do not receive therapy in time, which can lead to anxiety and fear in adulthood. However, with the right treatment, it's possible to overcome the psychological effects of fluency disorders. Speech-language pathologists play a vital role in supporting individuals experiencing speech difficulties. Cognitive-behavioural therapy (CBT) is a common treatment approach for fluency disorders, which educates clients and families about stuttering, avoidance behaviour, and negative thinking. By adopting this line of self-inquiry, clients can break the vicious cycle of anxiety, negative thinking, and withdrawal from social interactions. It's essential to acknowledge the varying degrees of severity and psychological impacts of fluency disorders and to seek help when needed. With early intervention and effective treatment, individuals can improve their communication skills and overall quality of life.

Acknowledgements

The content is solely the responsibility of the authors.

REFERENCES

- [1] Gillam RB., Marquardt TP, "Fluency Disorders," in Communication sciences and disorders: From science to clinical practice, 2nd ed, Jones & Bartlett Learning, 2019, pp. 154.
- [2] Logan KJ, "Foundational concepts," in Fluency disorders: Stuttering, cluttering, and related fluency problems, Plural Publishing, 2020, pp. 3-24.

- [3] Srivastava SR., "Accuracy vs. fluency in English classroom," *New man international journal of multidisciplinary studies*, vol. 1, no. 4, pp. 55-58, 2014, http://repositoriodspace.unipamplona.edu.co/jspui/bitstream/20.500.12744/6918/1/Diaz_2019_TG.pdf.
- [4] Rajeshwari S, Meenakshi S., "Margaret Atwood's Language Aspects in The Handmaid's Tale," *Theory & Practice in Language Studies*, Vol. 12, no. 9. pp. 1718-1722, 2022, <https://doi.org/10.17507/tpls.1209.03>.
- [5] Simon BSR, "Impact of Online English Language Instruction on the Fluency of Engineering Students," vol. 31, no. 13, pp. 83-106, 2023, https://kalaharijournals.com/resources/febV7_I2_223.pdf.
- [6] Evans MA., "Communicative Competence as a Dimension of Shyness. Social withdrawal inhibition and Shyness in childhood," 2013.
- [7] Tetnowski JA., Scott KS., Rutland BF., "Fluency and Fluency Disorders," *The Handbook of Language and Speech Disorders*, 2021, pp. 414-444.
- [8] Van Borsel J., Tetnowski JA., "Fluency disorders in genetic syndromes," *Journal of fluency disorders*. vol. 32, no. 4, pp. 279-96, 2007.
- [9] Yaruss JS., Quesal RW., "Academic and clinical education in fluency disorders: An update," *Journal of fluency disorders*. vol. 27, no. 1, pp. 43-63, 2002, [https://doi.org/10.1016/S0094-730X\(01\)00112-7](https://doi.org/10.1016/S0094-730X(01)00112-7).
- [10] Gerlach-Houck H., Kubart K., Cage E., "Concealing Stuttering at School: When You Can't Fix It...the Only Alternative Is to Hide It," *Language Speech Hearing Services in School*, vol. 54, no. 1, pp. 96-113, 2023, https://doi.org/10.1044/2022_LSHSS-22-00029.
- [11] Tichenor SE., Yaruss JS., "Stuttering as Defined by Adults Who Stutter," *Journal of Speech Language Hearing Research*, vol. 62, no. 12, pp. 4356-4369, 2019, [http://pubs.asha.org/doi/10.1044/2019_JSLHR-1900137].
- [12] Hearne A., Packman A., Onslow M., Quine S., "Stuttering and its treatment in adolescence: The perceptions of people who stutter," *Journal of Fluency Disorders*, vol. 33, no. 1, pp. 81-98, 2008, <https://doi.org/10.1016/j.jfludis.2008.01.001>.
- [13] Howell P., Bailey E., Kothari N., "Changes in the pattern of stuttering over development for children who recover or persist," *Clinical Linguistics and Phonetics*, vol. 24, no. 7, pp. 556-575, 2010, <https://doi.org/10.3109/02699200903581034>.
- [14] Lebrun Y., Leleux Ch., Retif J., "Neurogenic stuttering," *Acta Neurochir*, vol. 85, no. 3, pp. 103-109, 1987.
- [15] Ackermann H, Ziegler W. Brain mechanisms underlying speech motor control. *Handbook of Phonetic Sciences.*, 2010.
- [16] Theys C., Van Wieringen A., Luc F., "A clinician survey of speech and non-speech characteristics of neurogenic stuttering," *Journal of Fluency Disorders*, vol. 33, no. 1, pp. 1-23, 2008, <https://doi.org/10.1016/j.jfludis.2007.09.001>.
- [17] Mahr G., Leith W., "Psychogenic Stuttering of Adult Onset," *Journal of Speech, Language and Hearing Research*, vol. 35, no. 2, pp. 283-286, 1992, <https://doi.org/10.1044/jshr.3502.283>.
- [18] Yairi E., Ambrose N., Cox N., "Genetics of Stuttering: A Critical Review," *Journal of Speech, Language, and Hearing Research*, vol. 39, no. 4, pp. 771-784, 1996, <https://doi.org/10.1044/jshr.3904.771>.
- [19] Baumgartner J., Duffy JR., "Psychogenic stuttering in adults with and without neurologic disease," *Journal of Medical Speech Language Pathology*, vol. 1, no. 1, pp. 75-96, 1997, https://www.researchgate.net/profile/Joseph-Duffy-4/publication/279897923_Psychogenic_stuttering_in_adult_s_with_and_without_neurologic_disease/links/565493ca08aeafc2aabbe37d/Psychogenic-stuttering-in-adults-with-and-without-neurologic-disease.pdf.
- [20] Kraft SJ., Yairi E., "Genetic bases of stuttering: The state of the art," *Folia Phoniatrica et Logopaedica*, vol. 64, no. 1, pp. 34-47, 2011, <https://doi.org/10.1159/000331073>.
- [21] Yairi E., Ambrose N., "Epidemiology of stuttering: 21st century advances," *Journal of fluency disorders*. vol. 38, no. 2, pp. 66-87, 2013, <https://doi.org/10.1016/j.jfludis.2012.11.002>.
- [22] Ezrati-Vinacour R., Levin I., "The relationship between anxiety and stuttering: A multidimensional approach," *Journal of Fluency Disorders*, vol. 29, no. 2, pp. 135-148, 2004, <https://doi.org/10.1016/j.jfludis.2004.02.003>.
- [23] Smith KA., Iverach L., O'Brian S., Kefalianos E., Reilly S., "Anxiety of children and adolescents who stutter: A review," *Journal of fluency disorder urnal of fluency disorders*, vol. 40, pp. 22-34, 2014, <https://doi.org/10.1016/j.jfludis.2014.01.003>.
- [24] Han TU., Park J., Domingues CF., Moretti-Ferreira D., Paris E., Sainz E., Gutierrez J., Drayna D., "A study of the role of the FOXP2 and CNTNAP2 genes in persistent developmental stuttering," *Neurobiology of disease*, vol. 69, no. 1, pp. 23-31, 2014, <https://www.sciencedirect.com/science/article/pii/S0969996114001089>.
- [25] Mygind H., "On the Cause of Stuttering," *Annals Otology Rhinology Laryngology*, vol. 7, no. 4, pp. 688-697, 1898, <http://journals.sagepub.com/doi/10.1177/000348949800700408>.
- [26] Schoenen J., "Neurophysiological features of the migrainous brain," *Neurological Sciences*, pp. 77-81, 2006.
- [27] Jo Kraft S., Ambrose N., Chon H., "Temperament and Environmental Contributions to Stuttering Severity in Children: The Role of Effortful Control," *In Seminars in speech and language*, Vol. 35, No. 02, pp. 080-094, DOI:10.1055/s-0034-1371753.
- [28] Müller P., "The impediment that cannot say its name: Stammering and Trauma in Selected American and British Texts," *Anglia-Zeitschrift für englische Philologie*, vol. 130, no. 1, pp. 54-74, 2012, <https://doi.org/10.1515/ang-2012-0005>.
- [29] Guitart B., "Stuttering: An integrated approach to its nature and treatment," *Lippincott Williams & Wilkins*, 2013.
- [30] Klompas M., Ross E., "Life experiences of people who stutter, and the perceived impact of stuttering on quality of life: Personal accounts of South African individuals," *Journal of fluency disorders*, vol. 29, no. 4, pp. 275-305,

- 2004, <https://doi.org/10.1016/j.jfludis.2004.10.001>.
- [31] Scott KS., "Stuttering and Cluttering," *Research in Clinical Pragmatics*, vol. 29, no. 4, pp. 471-490, 2017, http://link.springer.com/10.1007/978-3-319-47489-2_18.
- [32] Bakker K., Myers FL., Raphael LJ., Louis KOS., "A preliminary comparison of speech rate, self-evaluation, and disfluency of people who speak exceptionally fast, clutter, or speak normally," In *Cluttering Psychology*, pp. 45-65, 2011.
- [33] Sonuga-Barke EJS., Brandeis D., Cortese S., Daley D., Ferrin M., Holtmann M., Stevenson J., Danckaerts M., Van der Oord S., Döpfner M., Dittmann RW., "Nonpharmacological interventions for ADHD: systematic review and meta-analyses of randomized controlled trials of dietary and psychological treatments," *American journal of psychiatry*, vol. 170, no. 3, pp. 275-289, 2013, <https://doi.org/10.1176/appi.ajp.2012.12070991>.
- [34] Pap J., "Effects of speech rate changes on pausing and disfluencies in cluttering," *Linguistics*, vol. 48, no. 1, pp. 203-222, 2019, <https://doi.org/10.21862/diss-09-020-pap>.
- [35] Ward D., "Motor speech control and cluttering," in *Cluttering: A handbook of research, intervention and education*, 2011.
- [36] Scaler Scott K., Gurtizen E., Giacumbo K., Kisenwether J., "A Perceptual Study of Communication Effectiveness in Cluttering," *Perspectives of the ASHA Special Interest Groups*, vol. 7, no. 5, pp. 1347-1356, 2022, https://doi.org/10.1044/2022_PERSP-22-00003.
- [37] Louis KOS., Hinzman AR., Hull FM., "Studies of cluttering: Disfluency and language measures in young possible clutterers and stutterers," *Journal of Fluency Disorders*, vol. 10, no. 3, pp. 151-172, 1985, [https://doi.org/10.1016/0094-730X\(85\)90008-7](https://doi.org/10.1016/0094-730X(85)90008-7).
- [38] Van Zaalen Y., Wijnen F., Dejonckere PH., "Cluttering and learning disabilities," *Cluttering: A Handbook of Research, Intervention and Education*, pp. 100-14, 2011.
- [39] Oliveira CMC., Bernardes AP., Broglio GA., Capellini SA., "Speech fluency profile in cluttering individuals," *Pró-Fono Revista de Atualiza ção Científica*, vol. 22, no. 1, pp. 445-450, 2010, <https://doi.org/10.1590/S0104-56872010000400014>.
- [40] Myers FL., "Treatment of cluttering: a cognitive-behavioral approach centered on rate control," in *Cluttering: A handbook of research, intervention and education*, 2011.
- [41] Tiger RJ., Irvine TL., Reis RP., "Cluttering as a Complex of Learning Disabilities," *Language, Speech, and Hearing Services in Schools*, vol. 11, no. 1, pp. 3-14, 1980, <https://doi.org/10.1044/0161-1461.1101.03>.
- [42] Levin AR., Fox NA., Zeanah Jr CH., Nelson CA., "Social communication difficulties and autism in previously institutionalized children," *Journal of the American Academy of Child & Adolescent Psychiatry*, vol. 54, no. 2, pp. 108-115, 2015, <https://doi.org/10.1016/j.jaac.2014.11.011>.
- [43] Sønsterud H., "The Importance of the Working Alliance in the Treatment of Cluttering," *Perspectives of the ASHA Special Interest Groups*, vol. 4, no. 6, pp. 1568-1572, 2019, https://doi.org/10.1044/2019_PERS-19-00057.
- [44] Maguire GA., Yeh CY., Ito BS., "Overview of the diagnosis and treatment of stuttering," *Journal of Experimental & Clinical Medicine*, vol. 4, no. 2, pp. 92-97, 2012, <https://doi.org/10.1016/j.jecm.2012.02.001>.
- [45] Fibiger S., "Stuttering," *International Encyclopedia of Rehabilitation*, 2013, <https://web.archive.org/web/20131110190444/http://cirrie.buffalo.edu/encyclopedia/en/article/158/>
- [46] Perez HR., Stoeckle JH., "Stuttering: clinical and research update," *Canadian family physician*, vol.62, no. 6, pp. 479-484, 2016, <https://www.cfp.ca/content/62/6/479.full>.
- [47] Myers FL., Louis KO., Bakker K., Raphael LJ., Wiig EK., Katz J., Daly DA., Kent RD., "Putting cluttering on the map: Looking back," In *Seminar presented at the Annual Convention of the American Speech-Language-Hearing Association*, 2002.
- [48] Ma Y., Oxley JD., Yaruss JS., Tetnowski JA., "Stuttering experience of people in China: A cross-cultural perspective," *Journal of Fluency Disorders*, vol. 77, no. 1, pp. 105994, 2023, <https://doi.org/10.1016/j.jfludis.2023.105994>.
- [49] Neumann K., Euler HA., Bosshardt HG., Cook S., Sandrieser P., Sommer M., "The pathogenesis, assessment and treatment of speech fluency disorders," *Deutsches Ärzteblatt International*, vol. 114, no. 22-23, pp. 383, 2017, <https://doi.org/10.3238/2Farztebl.2017.0383>.
- [50] Rifaie NAA., Saber AS., Kheir El-Din ST., Sallam YANM., Algamal AMAS., "Efficacy of the Arabic Modified Fluency Shaping Program in the treatment of stuttering," *The Egyptian Journal of Otolaryngology*, vol. 32, pp. 306-321, 2016.
- [51] Blomgren M., Roy N., Callister T., Merrill RM., "Intensive Stuttering Modification Therapy: A Multidimensional Assessment of Treatment Outcomes," *Journal of Speech Language Hearing Research*, vol. 48, no. 3, pp. 509-523, 2005, [https://doi.org/10.1044/1092-4388\(2005\)035](https://doi.org/10.1044/1092-4388(2005)035).
- [52] Everard RA., Howell P., "We Have a Voice: Exploring Participants' Experiences of Stuttering Modification Therapy," *American Journal of Speech-Language Pathology*, vol. 27, no. 3s, pp. 1273-1286, 2018.
- [53] Roth DA., Eng W., Heimberg RG., "Cognitive behavior therapy," *Encyclopedia of Psychotherapy*, pp. 451-458, 2002.
- [54] Hofmann SG., Asnaani A., Vonk IJ., Sawyer AT., Fang A., "The Efficacy of Cognitive Behavioral Therapy: A Review of Meta-analyses," *Cognitive therapy and research*, vol. 36, no. 1, pp. 427-440, 2012, doi:10.1007/s10608-012-9476-1.
- [55] Wenzel A., "Basic strategies of cognitive behavioral therapy," *Psychiatric Clinics*, vol. 40, no. 4, pp. 597-609, 2017, <https://doi.org/10.1016/j.psc.2017.07.001>.
- [56] Nnamani A., Akabogu J., Otu MS., Ukoha E., Uloh-Bethels AC., Omile JC., Obiezu MN., Dike AE., Ike CV., Iyekekpolo OM., "Cognitive behaviour language therapy for speech anxiety among stuttering school adolescents," *Journal of International Medical Research*, vol. 47, no. 7, pp. 3019-3014, 2019, <https://doi.org/10.1177/0300060519853387>.

- [57] Perry-Parrish C., Copeland-Linder N., Webb L., Sibinga EM., "Mindfulness-based approaches for children and youth," *Current problems in pediatric and adolescent health care*, vol. 46, no. 6, pp. 172-178, 2016, <https://doi.org/10.1016/j.cppeds.2015.12.006>.
- [58] Moreno-Jiménez JE., Rodríguez-Carvajal R., García-Rubio C., Castillo-Gualda R., Montero I., "Long-term effectiveness of a mindfulness based intervention (MBI) program for stuttering: A case study," *Clínica y Salud*, vol. 32, no. 2, pp. 55-63, 2021, <https://doi.org/10.5093/clysa2021a1>
- [59] Maguire GA., Nguyen DL., Simonson KC., Kurz TL., "The pharmacologic treatment of stuttering and its neuropharmacologic basis," *Frontiers in neuroscience*, vol. 14, no. 1, pp. 158, 2020, <https://doi.org/10.3389/fnins.2020.00158>.
- [60] Chen CM., Tan CC., Lo BJ., "Facilitating English-language learners' oral reading fluency with digital pen technology," *Interactive Learning Environments*, vol. 24, no. 1, pp. 96-118, 2016, <https://doi.org/10.1080/10494820.2013.817442>.
- [61] Lincoln M., Packman A., Onslow M., "Altered auditory feedback and the treatment of stuttering: A review," *Journal of Fluency Disorders*, vol. 31, no. 2, pp. 71-89, 2006.
- [62] Darvenkumar T., Rajasekaran WC., "Unlocking the Power of Online Gaming: Exploring Its Potential as a Language and Communication Tool in the English Classroom-A Survey," *Studies in Media and Communication*, vol. 11, no. 6, pp. 197-207, 2023, <https://doi.org/10.11114/smc.v11i6.6053>.
- [63] Jacobs CL., Loucks TM., Watson DG., Dell GS., "Masking auditory feedback does not eliminate repetition reduction," *Language, cognition and neuroscience*, vol. 35, no. 4, pp. 485-497, 2020, <https://doi.org/10.1080/23273798.2019.1693051>.
- [64] Fiorin M., Marconato E., Palharini TA., Picoloto LA., Frizzo AC., Cardoso AC., Oliveira CM., "Impact of auditory feedback alterations in individuals with stuttering," *Brazilian Journal of Otorhinolaryngology*, vol. 87, pp. 247-254, 2021, <https://doi.org/10.1016/j.bjorl.2019.08.005>.
- [65] Tichenor SE., Palasik S., Yaruss JS., "Understanding the Broader Impact of Stuttering: Suicidal Ideation," *American Journal of Speech-Language Pathology*, vol. 32, no. 5, pp. 2087-2110, 2023, https://doi.org/10.1044/2023_AJSLP-23-00007.
- [66] Sanghi M., Kelkar P., "Stuttering and other fluency disorders: an overview," *Understanding and Managing Fluency Disorders*, pp. 33-59, 2023, <https://www.taylorfrancis.com/chapters/edit/10.4324/9781003367673-3>.
- [67] Ajithkumar MU., "Training of Teachers: Institutionalising Training and Development of Academic Faculty of TVET Institutions for Realising Excellence," in *In India: Preparation for the World of Work: Education System and School to Work Transition*, Wiesbaden: Springer Fachmedien Wiesbaden, 2016, pp. 183-210.
- [68] Maruthy S., Kelkar P., "Understanding and Managing Fluency Disorders: From Theory to Practice," Taylor & Francis, 2023, <https://api.taylorfrancis.com/content/books/mono/download?identifierName=doi&identifierValue=10.4324/9781003367673&type=googlepdf>.
- [69] Leko Krhen A., Šušak L., "Internet searches conducted by people who stutter: association with speech-language therapy and severity of stuttering," *Logopedics Phoniatrics Vocology*, vol. 48, no. 3, pp. 146-153, 2023, <https://www.tandfonline.com/doi/full/10.1080/14015439.2022.2044513>.
- [70] Town R, Hayes D, March A, Fonagy P, Stapley E. Self-management, self-care, and self-help in adolescents with emotional problems: a scoping review. *Eur Child Adolesc Psychiatry* [Internet]. 2023 Jan 15 [cited 2023 Dec 22]; Available from: <https://link.springer.com/10.1007/s00787-022-02134-z>
- [71] Tang X., Hua Z., Xing J., Yi L., Ji Z., Zhao L., Su X., Yin T., Wei R., Li X., Liu J., "Verbal fluency as a predictor of autism spectrum disorder diagnosis and co-occurring attention-deficit/hyperactivity disorder symptoms," *Reading and Writing*, vol. 36, no. 6, pp. 1461-1485, 2023, <http://dx.doi.org/10.1007/s11145-022-10319-w>.
- [72] Roth FP., Worthington CK., "Treatment resource manual for speech-language pathology," Plural Publishing, 2023.
- [73] Hughes S., Gabel R., Irani F., Schlagheck A., "University students' perceptions of the life effects of stuttering," *Journal of communication disorders*, vol. 43, no. 1, pp. 45-60, 2010, <https://doi.org/10.1016/j.jcomdis.2009.09.002>.
- [74] Plexico L., Manning WH., Levitt H., "Coping responses by adults who stutter: Part II. Approaching the problem and achieving agency," *Journal of fluency disorders*, vol. 34, no. 2, pp. 108-126, 2009. Jun 1;34(2):108-26, <https://doi.org/10.1016/j.jfludis.2009.06.003>.
- [75] Campbell WN., Douglas NF., "Supporting evidence-based practice in speech-language pathology: A review of implementation strategies for promoting health professional behavior change," *Evidence-Based Communication Assessment and Intervention*, vol. 11, no. 3-4, pp. 72-81, 2017, <https://doi.org/10.1080/17489539.2017.1370215>