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Predicting the Onset of Stuttering in Preschool Children in the Wilaya of Ouargla

A Retrospective Study

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Dedication

To my mother and my sister

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Abstract

The current study investigates the factors that may trigger the onset of stuttering in preschool children in the willaya of Ouargla, Algeria. The study aims to provide speech therapists with a tool to predict the onset of stuttering, allowing for early intervention and prevention of persistent stuttering. The study also explores the relationship between stuttering and language, including the possible association between bilingualism and stuttering. The data was collected through a questionnaire and included information on family history, psychological trauma, parental punishment, co-occurrence with disordered language, and bilingualism. The study analyzes the frequency and percentage of each risk factor to determine their potential contribution to the onset of stuttering. Results indicate that genetics, environmental factors (such as socioeconomic status and parenting styles), and language disorders may all contribute to the development of stuttering. The study suggests a complex, multifactorial relationship between these factors and stuttering, highlighting the need for early intervention and a holistic approach to treatment.

Keywords: Stuttering, Preschool children, Onset, Early Intervention, Bilingualism

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1 Introduction

1.1 Background of the Study

In psycholinguistics, language disorders are the center of discussion during recent years. Fluency disorders are a major part of language disorders that can be presented under a variety of clinical manifestations. One of these fluency disorders is stuttering. Stuttering, which causes interruptions in ongoing speech, can be a life-altering condition.

Craig & Tran (2006) state that stuttering as a disorder usually appears in early childhood, (between 2 and 5 years old), and it affects about 5% of school-aged children (Conture, 2000). Despite the fact that most of children who stutter (CWS) spontaneously overcome the onset of stuttering during childhood, still 1% will keep the disorder for the rest of their lives (Reilly et al., 2009)

One of the most dilemmatic questions regarding stuttering has been its onset. Speech-language clinicians and researchers continuously try to understand the details of when, how, and what triggers stuttering. During the 20th century, several studies related to these questions have been conducted all over the world, had clearly established that the great majority of stuttering cases appears in childhood, especially its early period. A few cases, however, begin stuttering during their teens. As supported by numerous empirical studies, Early Intervention (EI) has a beneficial effect on the course of stuttering, (e.g. Howell, 2013; Jones et al., 2008). As a result, intentional or unintentional delaying treatment appear to increase the risk of persistent stuttering throughout life. Thus, determining the factors that may provoke the onset of stuttering seems to be of colossal importance.

1.2 Problem Statement

From what was mentioned above, we can notice that determining the factors that could trigger the onset of stuttering is vital. Indeed, many studies have been focusing on those factors, but not in the researcher's local community (willaya of Ouargla, Algeria). Stuttering, as a disorder, has been neglected by parents, teachers, and sometimes by the stutterers themselves in hope that the stuttering episode would resolve by itself. However, as indicated previously, spontaneous resolution is not always the case for all CWS. Thus, an early intervention by the speech therapist is the best plan of action to confirm the diagnosis of stuttering and determine its prognosis. As known, prevention is the best cure. Our research aims to answer the following question:

1) What are the main factors that might trigger the stuttering onset in preschool children in the willaya of Ouargla, Algeria?

2) How can the knowledge about the factors of stuttering help in predicting its onset?

1.3 Objectives of the Study

This research tries to investigate the factors that may trigger the onset of stuttering in preschool children. The long-term goal of the present study is to provide speech therapist with the tool to predict the stuttering onset, and in so doing, they would be able to act quickly when a stuttering event is to be triggered, emphasizing the beneficial impact of EI in decreasing the risk of persistent stuttering. Moreover, an additional focus will be put on exploring the relationship between stuttering and language; especially, the relationship between stuttering and bilingualism, since bilingualism is common phenomenon in our society.

1.4 The Significance of the Study

This study investigates the factors that may trigger the onset of stuttering. Through the exploration of these factors, the circumstances that surround the stuttering onset would be exhaustively understood. In so doing, speech therapists would be provided by the tool to diagnose the stuttering onset in its early stage or even predict this stuttering onset which allows them to intervene quickly and manage this onset to prevent the risk of persisting stuttering which proved to be hard to manage.

1.5 Definition of Key Terms

It is necessary here to clarify exactly what is meant by some terms used in this study

Stuttering: despite the fact that defining stuttering appears to be easy at the first glance, it has proved to be problematic through history. However, a recent definition will be taken as a reference in this study. It is the definition proposed by Guitar (2014) in which he suggests that stuttering consists of stoppages or pauses that affect the flow of speech with unnaturally high recurrence and/or duration. These pauses typically take the shape of (a) sound, syllables, or one-syllable words repetitions, (b) sound prolongations, or (c) 'blockages' or 'blocks' of airflow or voicing in speech.

Preschool child: according to the USA centers for diseases control and prevention (CDC), preschool child is any child from three years of age to five years of age.

1.6 Structure of the Dissertation

This dissertation is structured into two main sections: a literature review and a practical part. The literature review consists of three chapters that explore various aspects of stuttering. Chapter one provides an overview of the etiology of stuttering and discusses the various theories that have been proposed to explain its causes. Chapter two examines the epidemiology of stuttering, including its prevalence, age of onset, and social factors that may influence its development. Chapter three focuses on the relationship between stuttering and language, including concomitant language disorders and bilingualism.

The practical part of the dissertation includes two chapters. Chapter four outlines the research design and methodology, including a description of the questionnaire used to gather data, the population and sampling procedures, and ethical considerations. Chapter five reports on the results of the study and provides a discussion of the findings. This chapter is divided into three sections, corresponding to the three main topics covered in the literature review: epidemiological factors, etiological factors, and language and stuttering. The chapter concludes with a recapitulation of the main findings and their implications for understanding and treating stuttering. Overall, this dissertation provides a comprehensive examination of stuttering from both a theoretical and practical perspectiv

2 Chapter One: Etiology of Stuttering

Introduction

Many theories have attempted to explain the etiology of stuttering; however, despite the plethora of research, the exact underlying cause of stuttering is still unknown. Nevertheless, it is universally accepted that stuttering is a multifactorial disorder combining genetic predisposition with environmental, neurological, physiological, psychological, and learned behavioral factors (Ambrose, 2004; Onslow, 2004). This chapter will give an overall view about these etiological factors in exploring the most prominent studies regarding these factors.

2.1 Genetics and Familial Links

Heredity has been broadly accepted as an etiological factor for stuttering (Ambrose, 2004; Newbury & Monaco, 2010; Onslow, 2004). Studies on twins have demonstrated that there are familial links because there are evidences that one twin is more likely to stutter if their other twin sibling also stutters, especially for monozygotic (MZ) twin pairs (Ambrose et al., 1993). However, there are cases of MZ twins where just one of the twins does actually stutter (Dworzynski, Remington, Rijsdijk, Howell, & Plomin, 2007). Moreover, only around 50% of stutterers are known to have a familial history of the condition (Ambrose, 2006; Riaz et al., 2005). The hereditary component of stuttering is in fact a genetic predisposition that would be intensified when interacting with other factors (Kraft & Yairi, 2012; Wingate, 2002). That is to say, some individuals stutter due to a genetic predisposition, and stuttering emerges as a result of contributions from additional factors, like environmental or neurological dynamics.

2.2 Physiological Theories

Sporadically, stutterers may experience tightness and even pain in their throats and/or chests during the stuttering episode that may be caused by the "miscoordination of an otherwise normal respiratory, vocal, and articulatory system" (Montgomery, 2006, p. 162), resulting in the speaker's inability to regulate their muscles and diaphragm. Variable pace, timing (Olander, Smith, & Zelaznik, 2010), and, in certain circumstances, clumsiness in speech (Manning, 2010) can also be signs of motor control deficits. Moreover, studies show that even when there are no obvious stuttering behaviors, those who stutter have deficits in their speech motor control system (Montgomery, 2006; Olander et al.,2010).

2.3 Neurological Theories

Researchers have tried to prove that neurological abnormalities are the cause of stuttering. Positron emission tomography (PET) imaging was used by Fox et al. (2000) to explore the link between stuttering and speech-motor areas in the cerebellum and both hemispheres. Using PET and electroencephalography (EEG) technology, Fox et al. (2000) have proven that the area that controls speech in fluent people resides in the left cerebral hemisphere. Additionally, people who stutter have an overactive right cerebral hemisphere, which is the region responsible for emotions, in the brain.

Further, neurotransmitters, such as dopamine, serotonin, and norepinephrine have been investigated for their role in the mechanism of stuttering (Kalat, 2007). Those neurotransmitters travel from the right to the left hemisphere during speech, stimulating more activity in the left brain's speech centers. Dopamine has been the subject of certain studies (Comings et al., 1996; Wu et al., 1997), whereas serotonin has been the focus of others (Costa & Kroll, 2000). The degree of emotional or environmental stress increases the level of chemical activity in the right hemisphere, which negatively impacts the brain connections that regulate speaking behaviors. As a result, the brain networks that control the laryngeal muscles, articulators' coordination, and auditory feedback (i.e., how a stutterer hears themselves) are disrupted.

For each person who stutters, the pattern's manifestation and the level of disruption might differ. Onslow (2004) accepts these theories as one element of a multifaceted pathophysiology. Any consideration of the neurological causes of stuttering must also address the opposing hypothesis: Does stuttering cause abnormalities in brain activity, or do abnormalities in brain activity cause stuttering? Therefore, further exploration is needed to investigate this possible reciprocal relationship between stuttering and neurological abnormalities.

When the relationship between stuttering and neurological function is discussed, a variety of common themes emerge. First, those who stutter have a different brain activity when they stutter as opposed to when they do not. Second, compared to those who do not stutter, a stutterer's brain exhibits differing levels of activity in the cerebral zones linked to language and motor speech production (Ingham et al., 2004). Finally, hemispheric irregularity in the motor centers of the non-dominant hemisphere, which is commonly the right side, appears to be primarily responsible for stuttering (Buchel & Sommer, 2004). According to extensive research on stuttering, neuromotor factors are more plausible to be the cause of stuttering (Ramig & Dodge, 2010), than psychological factors.

2.4 Other Theories

Other theories tried to explain the mechanism of stuttering from another angle, mostly from psychological point of view. In the Breakdown Theory, it is believed that stuttering is caused by a mixture of early environmental stress and neurological predisposition (Biermann-Ruben, Salmelin, & Schnitzler, 2005). Meanwhile, according to the Repressed Need Theory, those who stutter have an unmet emotional need that has been repressed, and their stuttering behaviors are a symbolic expression of this repressed need (Bloodstein & Bernstein Ratner, 2008). The Anticipatory Struggle Behavior Theory suggests that parental punishments for usual and normal disfluencies or pressures stemming from prior oratory failures are the main causes of stuttering. Therefore, stuttering is believed to be a learned behavior that is provoked by the child's dread and anticipation. As a result, the child struggles to suppress stuttering, which leads to the stutter itself (Bloodstein & Bernstein Ratner, 2008) and putting the child in a vicious circle.

2.5 A Multifactorial Etiology

Stuttering is an intricate and heterogeneous disorder with clinical inconsistency within stutterers, indicating that a multifactorial account for the origin of the disorder is more plausible. In the same line, Manning (2010) suggests three models to explain the etiology of stuttering: Demands and Capacities, Dynamic-Multifactorial, and Neurophysiological.

According to the Demands and Capacities Model, stuttering is triggered when a child who is genetically predisposed for stuttering discovers that their capacity for language is exceeded by some external demands (parental speaking rate, interruptions, and language complexity) or internal demands (the complexity of their own thoughts they wish to express, for instance) (Arndt & Healey, 2001; Gottwald & Starkweather, 1995; Lattermann, Shenker, & Thordardottir, 2005). A child may be forced to make compromises in vocabulary or syntax if there is an undue demand on one aspect of language, say semantics. According to this hypothesis, stuttering in children may be a result of their sophisticated motor and language systems being overwhelmed by these demands (Blood, Ridenour, Qualls, & Hammer, 2003).

To the Dynamic-Multifactorial Model, stuttering is a complex, changing, and dynamic disorder that covers a variety of underlying processes (Ambrose, 2004). According to this model, a thorough examination of each these processes is necessary before the most likely cause of a person's stuttering is identified.

The Neurophysiological Model considers three factors that affect human behavior: neurological processing, output, and environment. The way that these factors change between and within people who stutter in different ways may help explaining the variety of stuttering clinical expressions (De Nil, 1999).

Conclusion

This chapter provides an overview of the etiology of stuttering, a multifactorial disorder that results from the interaction of genetic predisposition, environmental, neurological, physiological, psychological, and learned behavioral factors. While there is a strong genetic component to stuttering, only around half of stutterers have a familial history of the condition. Physiological theories suggest that motor control deficits contribute to stuttering, while neurological theories propose that abnormalities in brain activity may be the cause. Other theories, such as the Breakdown Theory and the Repressed Need Theory, propose environmental and psychological factors as the underlying cause of stuttering. Overall, stuttering is a complex disorder, and further research is needed to better understand its underlying causes.

3 Chapter Two: Epidemiology

Introduction

Generally speaking, epidemiology gives us an insight about the population at risk to develop a particular disorder, its prevalence, its distribution (age, gender, and race), and circumstances of occurrence. Concerning the epidemiology of stuttering, there is a bourgeoning body of knowledge that is developing since the last century. Many researches attempted to shed light on epidemiological factors that correlate with stuttering. In this current chapter, the literature related to these factors will be elaborately examined.

3.1 Age of Onset

The fact that most of stutterers are children makes stuttering a childhood disorder. Most researches report that stuttering starts in the early stages of language acquisition. Despite the fact that this period of extensive language acquisition involves rapid vocabulary acquisition as well as an increased child's awareness of a variety of morphological and syntactic principles (Ntourou et al., 2011), the majority of children develop a considerable amount of vocabulary and grammatical base before exhibiting any abnormal disfluencies (Fogle, 2012). This is crucial since infants stutter more frequently while communicating in longer and more syntactically complex sentences (Ntourou et al., 2011).

The ability to interpret linguistic stimuli, motor skill development, and neurological functioning are among the variables that may have an impact on the onset of stuttering (Millard et al., 2008). Moreover, the start of school can promote stuttering behaviors as young children start to notice the disparities between themselves and their peers, and critically evaluate their own speech (Ivoskuviene & Makauskiene, 2009). Ramig and Dodge (2010) believes that many children who stutter find it stressful and shameful, and as a result they may react in class by shying away from speaking opportunities.

In the same line of thought, in the realm of stuttering onset, three notable studies have been conducted. The first study, carried out by Mansson (2000), involved 12 children, and the age of onset ranged from 24 to 42 months. Of these, 67% of the children had a gradual onset while 33% had a sudden onset. The second study, conducted by Reilly (2009), found that the cumulative incidence of stuttering onset was 8.5% by the age of 3. The third study, performed by Yairi and Ambrose (2005), discovered that the onset of stuttering typically occurs before the age of four, with a 5% chance of developing stuttering after this age. All three studies used a prospective longitudinal methodology, but the population sample sizes and data collection methods varied. Reilly's study had the largest population sample size and thus is considered the most reliable. Table 1 summarizes the results of these studies, indicating that the average age of onset is around 31 months. Yairi and Ambrose (2005) found a high concentration of onsets, approximately 60%, between the ages of 24 and 35 months. The follow-up in Mansson's (2000) study was based on the reports of school speech therapists, and only two more cases were recorded five years later. Overall, these studies suggest that stuttering onset typically occurs at a young age and is a rare occurrence after the age of four.

Table 1.

Studies Investigating the Age and the Gender of the Onset of Stuttering

Study	Sample size	M/F Ratio	Upper age (Years)	Age at onset (Months)
Yairi & Ambrose (2005)	163	2.1	By age 6	33.6
Mansson (2005)	179	1.34	By age 4	30
Reily, et al. (2009)	137	1.58	By age 3	29.9

3.2 Prevalence and Gender

With age, the prevalence of stutterers changes. Stuttering affects 5% of preschool children (Dworzynski et al., 2007; Lewis, Packman, Onslow, Simpson, & Jones, 2008), compared to 1% of adults (Bloodstein & Bernstein Ratner, 2008). While the number of individuals who stutter declines with age, the gender gap widens. Sixty-six percent of preschoolers who stutter are male (Dworzynski et al., 2007), and that number rises to 80% among adults (Onslow, 2004; Wingate, 2002).

Therefore, it is evident from a review of current studies that prevalence is significantly higher in children under age 6 compared to that of adults, which means that many children overcome stuttering before that age, either naturally or with clinical assistance.

Regarding the gender issue, certain data have been collected. There are not many disparities between boys and girls in terms of age at the onset. The differences among any of the three preschool studies previously mentioned were not statistically significant. Male-to-female ratios of 4:1 or higher among adults who stutter indicate a considerable gender bias that has long been recognized (Bloodstein, 1995). The ratios are significantly reduced in very young children who are close to the onset of stuttering, as shown in Table 1; the younger the children, the smaller the ratios. This may be explained by the fact that stuttering recovery is significantly more common in girls than in boys, according to the smaller tendency of affected males versus females close to the time of onset compared to the tendency at more advanced ages.

3.3 Concomitant Health Issues

Other health issues that can affect fluency are highlighted by Blood et al. (2003) and Manning (2010), including Tourette's syndrome, Autism Spectrum Disorders, and Attention Deficit Hyperactivity Disorder (ADHD). According to Wingate (2002), stuttering is substantially more common in people with mental disabilities and it is most common in those with Down syndrome. Blood et al. (2003) has investigated co-occurring disorders in 2628 children who stutter, and they concluded that non-speech language disorders occurs in only 34.3% of children who stutter. Those disorders were represented by learning disabilities (15.2%), literacy disorders (8.2%), and attention deficit disorders (ADD) (5.9%). Additionally, males were more affected by those co-occurring non-speech-language disorders than females.

Furthermore, Eskandari (2003) has investigated the association between asthma and stuttering. He examined 33 stutterers and 57 non-stutterers concluding that there is a substantial connection between asthma and stuttering when he discovered that 9 out of 33 stutterers (27.3%) were affected with asthma while asthma was found only in 6 out of 57 non-stutterers (10.5%).

3.4 Race and Ethnicity

The relationship between stuttering and race is controversial. Proctor et al. (2008) have published the most renowned study in regard to this question, during which 3,164 children, from the age of 2 to 5 years, have participated including 2,223

African Americans and 941 European Americans. At the end, they reported that there is no notable difference in prevalence among the two groups. To a greater extent, Boyle et al. (2011) have conducted a survey of 119,367 parents and guardians of children from the age of 3 to 17 years, asking them if any of their children had any childhood disabilities, including stuttering. Concerning stuttering, a trend for racial differences was found. Prevalence was 1.27 % for the non-Hispanic White group, 2.63 % for the non-Hispanic Black group, and 1.9 % for all Hispanic group. Despite these findings, a further and careful studies should be conducted to investigate race and ethnicity thoroughly as a risk factor for stuttering; plus, the target population should be enlarged to include Black Africans and Asians.

3.5 Social Factors

There are several limitations to the assumption that stuttering prevalence is affected by familial socio-economic status (SES), which is represented by the contradictory findings in recent studies done by Reilly et al. (2009) and Boyle et al. (2011) to investigate social factors and their influence on the occurrence of stuttering. On the one hand, Reilly et al. (2009) have reported that there is a positive proportional relationship between stuttering occurrence and the family's SES; in other words, stuttering occurs more in families with high SES. Moreover, the Reilly's study indicates that there is a positive proportional relationship between mother's educational level and stuttering. On the other hand, Boyle et al. (2011) reported that there is an inverse proportional relationship between mother's educational level and stuttering. This means that there is also an inverse proportional relationship between stuttering occurrence and the family's SES.

Conclusion

In conclusion, this chapter has provided a comprehensive review of the literature on epidemiological factors associated with stuttering. The studies reviewed emphasis the fact that stuttering is indeed a complex disorder, and it is a childhood disorder that usually begins in the early stages of language acquisition. Moreover, the prevalence of stuttering varies across different age groups, genders, and ethnicities. In saying so, although significant progress has been made in understanding the epidemiology of stuttering, there is still much to be learned about the disorder.

4 Chapter Three: Language and Stuttering

Introduction

The relationship between language and stuttering has been explored by many studies. Early studies showed that linguistic factors have a significant impact on the occurrence of stuttering events in particular parts of the speech stream (for example, at the beginning of sentences) and in words belonging to specific grammatical classes (for example, verbs and adjectives) (Brown, 1945). In addition, several studies have demonstrated that the stuttering onset occurs during a crucial period of the child's language development (Yairi, 1983, Ratner, 1997). Numerous models, with a psycholinguistics perspective, have been proposed to explain the link between stuttering and language. Overall, in all of these models, five linguistic factors were investigated: phonological aspects, loci of stuttering, language(s) complexity (bilingualism), pragmatics (language use), and language skills. In the present chapter, this relationship between language and stuttering will be explored.

4.1 Concomitant Language Disorders

Children who stutter may exhibit other speech and/or language disorders alongside stuttering; including: articulation, voice, learning, and/or reading disorders (Arndt & Healey, 2001). According to several studies, those who stutter often have articulation abnormalities and a delay in the outset or progression of speech (Blood et al., 2003; Ntourou et al., 2011; Wingate, 2002).

Blood et al. (2003) investigated 2628 school age children with stuttering, and found that 1650 (62.8%) of them presented another speech, language, or non-speech disorders; namely, articulation (33.5%) and phonological (12.7%) disorders, while expressive semantic disorder (13.5%) and receptive semantic disorder (12.1%) were the most recorded language disorders. Plus, Learning (11.4%) and literacy (8.2%) represented the most common non-speech-language concomitant disorders. Furthermore, Blood et al. (2003) concluded that speech-language disorders represent the largest percentage (49%) of co-occurring disorders.

Nevertheless, Ntourou et al. (2011) in their meta-analysis pinpointed that some studies found that children who stutter have lower language skills than their classmates who speak fluently (Anderson & Conture, 2000; Bernstein Ratner & Silverman, 2000), others stated that there were not any discernible disparities between them (Bonelli, Dixon, & Bernstein Ratner, 2000; Nippold, Schwarz, & Jescheniak, 1991), while others claimed that a stuttering child had basic language skills (Reilly et al., 2009).

However, Ntourou et al. (2011), in their own study, deduced that children who stutter, compared to their fluent classmates, seem more prone to have concomitant language disorders, and on seven out of ten language skills tests, non-stuttering children perform better than stuttering children. Furthermore, in a study of 467 children with documented fluency difficulties, Arndt and Healey (2001) reported that 44% also had concomitant phonological and/or language disorders. According to the same study, more than 33% of children who stutter also have concomitant articulation problems, and about 12% of children who stutter also have phonological problems; both statistics are much higher than would be anticipated in the general population (Blood et al., 2003).

For a number of reasons, children who stutter are more likely to develop a speech or language disorder. If a child with stuttering has another problem, learning to communicate properly will present extra challenges. As a result, they may begin to feel that communication is challenging. The outcome might be that the child is put under pressure beyond what he or she is capable of managing (Blood et al., 2003). Likewise, according to advocates of motor theories of stuttering, coexisting disorders not only interfere with the development of fluent speech but also promote the development of stuttering (Blood et al., 2003).

On the one hand, people who stutter may physiologically already have limited speech motor control and language formulation abilities, which would only be made worse by concomitant disorders. On the other hand, those who stutter may have a mechanism that encodes speech and produces language that is more prone to be disturbed.

4.2 Bilingualism and Stuttering

Unless otherwise stated, bilingualism is defined, in its broad sense, as a state that can range from a full, simultaneous, and alternating control of two languages to the degree of certain control of a second language besides the total inherited control of the native language by an individual (Siguan & Mackay, 1987).

It is accepted in regard to bilingualism in young children that the job of a child becoming bilingual is highly challenging (Vihman & McLaughlin 1982; Volterra & Taeschner 1978). The child must first become conscious that he or she is exposed to two different languages. This involves learning the different sounds associated with each language as well as the fact that the same items and actions have different attributes in each language (MacNamara 1972). The child will eventually need to understand that there are specific rules for how to communicate the same ideas in each language, and the manner of communication in each language is different. Therefore, the child has no option but to distinguish between the two

languages and develop a competence in both of them as a result to the pressure made by their linguistic environment (Redlinger & Park, 1980; Swain 1972). The child may use some techniques to avoid the need to acquire (or maintain) proficiency in both languages in contexts when bilingualism may be circumvented in some way (for example, if the child knows that his or her listeners are also bilingual). For instance, the fact that school-age immigrant children still understand their native language but have mostly lost their capacity to use it productively has frequently been reported (Dale 1977, Magiste 1979).

Stuttering frequently seems to be associated with bilingualism when there is no other way to properly function in a bilingual situation other than by being proficient in both languages. Stuttering seems to be more common among bilinguals than in monolinguals, despite the fact that the intriguing relationship between bilingualism and stuttering has not been specifically studied. It has been mentioned in several stuttering discussions that bilinguals tend to stutter rather frequently (Eisenson 1984; Mattes & Omark 1984; Shames 1989).

Several studies have hypothesized that bilinguals are more likely than monolinguals to suffer from stuttering (for instance, Eisenson, 1984; Karniol, 1992; Mattes & Omark, 1991; Shames, 1989). Travis, Johnson and Shover (1937) conducted a study on 4827 children (2405 boys and 2422 girls). They concluded that the stuttering prevalence in their population was 2.61%; plus, the prevalence was 1.80% in monolingual English-speaking children which was less significant compared to the prevalence of stuttering in those speaking one (2.80%) or two (2.38%) other languages. The same conclusion was drawn by Stern (1948) in his study, that was cited in Bloodstein (1995), where he studied 1861 children and found out that those who were bilingual had a stuttering prevalence of 2.16% compared to children who were monolingual (1.66%).

Moreover, Tavis et al. (1937), in their attempt to explain the relationship between stuttering and bilingualism, found out that the age of onset of stuttering overlapped with the introduction of the second language in 26% of the cases, suggesting a direct relationship between stuttering and bilingualism. In the same vein, Karniol (1992) posited that stuttering is the result of a syntactic overload made by the introduction of the second language.

A further element was identified by Lebrun and Paradis (1984) that could play a role in triggering stuttering in bilinguals. They emphasized the value of language stimulation for bilingually raised children. They specifically proposed that bilingual children with a predisposition to stuttering could acquire stuttering as a result of exposure to linguistically mixed utterances. It was suggested that speech production is hindered in stuttering children because they find it difficult to choose

just one of two equivalent linguistic words crossing their minds, because it is very often that monolingual stutterers typically mix two synonymous words or sentences. The challenge would be exacerbated if two languages were spoken in a quasisimultaneous manner.

In a study in the Algerian context, Amrani and Aiouadj (2020) have studied 24 monolingual and bilingual (Chaoui and Arabic) children with stuttering. They concluded, despite the small size of the population, that there is a strong link between stuttering and bilingualism, especially when the two languages are introduced simultaneously.

Conclusion

All in all, the relationship between language and stuttering is a well-researched area, and several studies have investigated the impact of linguistic factors on stuttering. Children who stutter often exhibit other speech and language disorders, including articulation, phonological, receptive and expressive semantic, learning, and literacy disorders. Bilingualism is also a factor that can affect stuttering. Learning two languages can be challenging for a child, and the child must learn to distinguish between the two languages and develop competence in both. The pressure of this process can cause disruptions in speech and language development, potentially leading to stuttering.

5 Chapter Four: Research Design and Methodology

Introduction

This research tries to investigate the factors that may trigger the onset of stuttering in preschool children. To achieve this objective, a quantitative approach was adopted. This chapter presents the methodology for data collection and the procedures used to analyze the findings.

5.1 Design and Methodology

The study is mainly retrospective and descriptive. On the one hand, Hess (2004) reports that a retrospective study relies generally on using data that has been already collected for reasons other than research. Compared to prospective studies, retrospective studies do not need a long-term follow-up of the participants and they require less time. Kumar (2010) further explains that "Retrospective studies investigate a phenomenon, situation, problem or issue that has happened in the past. They are usually conducted either on the basis of the data available for that period or on the basis of respondents' recall of the situation" (p.110). In the same vein, Hess (2004) pinpoints that retrospective studies can be beneficial, even though they are typically discouraged for being 'quick and dirty'; especially when a prospective study is possible. He further explains that it can serve as pilot research that is done in advance of a prospective study. In doing so, the retrospective study can help in narrowing the study topic, defining the hypothesis, choosing the right sample size, and pinpointing problems with prospective study feasibility (Hess, 2004). On the other hand, a descriptive study represents the first step in investigating a given phenomenon. It is "concerned with and designed only to describe the existing distribution of variables, without regard to causal or other hypotheses" (Last, 2000, p.50). In so saying, it gives us a picture about a phenomenon and its distribution among a particular population.

The study follows a quantitative approach, since it seeks to investigate the distribution of risk factors that may trigger stuttering among preschool children. Backboned with principles from the positivism paradigm, the quantitative approach aims to study a given phenomenon objectively and without any external manipulation with the sole purpose of giving a realistic picture of the phenomenon in question. As explained in Creswell (2018), the quantitative approach is most appropriate "if the problem calls for (a) the identification of factors that influence an

outcome, (b) the utility of an intervention, or (c) understanding the best predictors of outcomes" (p.57).

5.2 Methods

Given the descriptive nature and the quantitative approach adopted in this study, a questionnaire is found to be the appropriate tool to collect data retrospectively. Putting aside the fact that data collected using questionnaires are deemed to be superficial and biased, questionnaires are less time consuming and less affordable compared to other data collecting methods (Tavakoli, 2012); therefore, questionnaires are one of the most popular methods for gathering data. Despite the general assumption that questionnaires are easy to design, it takes a lot of work to design an effective questionnaire that gathers the information needed to answer particular research questions and has an acceptable response rate. Moreover, according to Creswell (2018) questionnaires may aid researchers to obtain answers for three types of questions: (a) descriptive questions concerned with numeric data, which is the case of the present study; (b) questions that involve the investigation of relationships between variables; and(c) questions about how to predict the longitudinal relationships between variables.

5.2.1 Description of the Questionnaire

The questionnaire that was used for collecting data is made of 21 questions (see Appendix A). It was created by the author purposively for the current study where considered questions were solely based on data found in the literature. Each question was checked to ensure that it was free of words, idioms, or syntax likely to alter the respondents' comprehension of them. The questionnaire consists of an introduction that contains a thorough explanation of the questionnaire and the study. This introduction is followed by four sections.

- **Section one:** it contains five close ended questions that deal with demographic information; namely, age of the participant, their gender, residency, ethnicity, and the bilingual status of the child.

- **Section two:** it consists of seven closed ended questions concerning the parent's education and socio-economic status, family history of stuttering and the language(s) used at home.

- **Section three:** it has four questions that focus on the child's medical history and their siblings.

- **Section four:** it contains five open ended questions, with the exception of both questions N°20 and N°21, that deal with the circumstances that surrounded the onset of stuttering.

5.2.2 Administration of the Questionnaire

First of all, the questionnaire was translated into Arabic so the children's parents could answer it (see Appendix B). Then, the Arabic version has been administered to the parents with the help of speech therapists working at the general county hospital Mohamed Boudiaf of Ouargla and at private practice clinics. The questionnaire was explained to the parents. Then, the parents were given approximatively five to ten minutes to answer the questionnaire in a quiet environment. The administration of the questionnaire and the collection of the answers took approximatively forty-five days.

5.2.3 Piloting

Piloting is the process of testing and assessing the data collection tool by administering it to a small representative group of individuals (Cohn, Manion, & Morrison, 2013). This process is regarded as a crucial step before implementing the actual study because it would give the researcher an overall insight about the adequacy of the data collection tool by pointing out its weaknesses and its lacks (Cohn et al., 2013). However, in this current study, the piloting step was skipped simply because of the small number of the participants that has been found in the willaya of Ouargla.

5.3 Population and Sampling

The study population comprises preschool children ranging from the age of 2 to 5 years old. In total, the parent of 41 CWS were involved. The participants are preschool children, that is to say between 2 and 5 year old, who have been already diagnosed with developmental stuttering. The data was collected during the year of 2022 and the two first months of 2023 when the study was completed on the last day of February. The inclusion criteria that have been set for the study are as follows: (1) only children with developmental stuttering and (2) only preschool children, that is to say between 2 and 5 year old. During the period of the study, a total of 365 children had been seen by speech therapists working in both public institution (Mohamed Boudiaf public hospital of Ouargla) and private sector (two private practice clinics) in the willaya of Ouargla where only 41 children were diagnosed with the problem of stuttering who meet the inclusion criteria of the current study. Due to the small number of participants, a total investigation has been conducted

on our population, that is to say the study investigated and analyzed every single participant without taking any samples.

5.4 Data Analysis Procedure

The data analysis methods used in this study were determined by the research question driving this study, and the data collection method used by the researcher. The questionnaire was analyzed quantitatively in order to uncover the factors that may trigger the onset of stuttering in our population. Thus, the data collected via the questionnaire were analyzed using Statistical Package for Social Sciences (SPSS) software in order to obtain statistical representation for each factor.

- **Coding:** As a first step, the possible answers to each question from the questionnaire were coded into the SPSS program. The data obtained via the questionnaires were filled in the SPSS program using the codes previously given to each answer.

- **Statistical analysis:** A quantitative data analysis has been conducted on the obtained data using descriptive and inferential statistical analysis. In the descriptive analysis, percentages and sex-ratio (male to female ratio) were calculated. In the inferential analysis, a univariate analysis was performed to assess the relationships between each factor and stuttering. This relation was expressed by calculating the chi-square test (X^2), P-values, odds ratio (OR), and the relative risk of each factor in relation de stuttering via SPSS software.

5.5 Ethical Considerations

The parents of the children were met before the study commenced, and the aim of the research and the nature of the study were clearly explained to them in both verbal and written ways as a part of the questionnaire. Informed consent was obtained from the parents of all the participants prior to the commencement of the study. All the parents were ensured that the identities of their children would remain confidential.

Conclusion

In this chapter, the methodology adopted and the analysis procedure were presented and explained. This study used a retrospective design to collect data from parents of preschool children in the willaya of Ouargla, Algeria. A questionnaire was used to gather information on demographic characteristics, parenting styles, psychological trauma, family history, the possible effect of bilingualism and other

language disorders on stuttering in preschool children. The data was analyzed using descriptive statistics, chi-square tests, odds ratios, and relative risks. In the next chapter, the results obtained from the data analysis are presented and discussed thoroughly.

6 Chapter Five: Reporting the Results and Discussion

Introduction

An analysis of research data gathered is presented in this chapter, and the study's research question is addressed. Quantitative results from the data collected by means of questionnaire are examined.

6.1 Reporting the Results

The research question is focused on determining the main factors that could trigger the onset of stuttering in preschool children in the willaya of Ouargla, Algeria. The study aims to identify these factors in order to better understand the causes of stuttering and to develop strategies for predicting its onset. Therefore, quantitative results for each of the factors that may influence de the onset of stuttering is presented in this section.

6.1.1 Epidemiological Factors

In this section, the epidemiological factors associated with stuttering will be explored based on the results obtained from the retrospective study conducted in the willaya of Ouargla, Algeria. The aim of this section is to provide insight into the epidemiological factors that contribute to stuttering, including its prevalence, age on onset, gender, ethnicity, socioeconomic status, family history, and comorbidities.

6.1.1.1 Prevalence

Based on the questionnaire, prevalence figures were estimated. It should be noticed that throughout the literature, determining the prevalence of stuttering was potentially challenging. In epidemiology, prevalence is the percentage of people who, over a particular period of time, exhibit a particular medical condition. It can be defined by the following equation and it is expressed as a percentage of the population:

$$\text{Prevalence (\%)} = \frac{\text{Number of people in sample with characteristic}}{\text{Total number of people in sample}} \times 100$$

Based on the obtained data, and by applying the above-mentioned equation, the prevalence of stuttering in preschool children in the Willaya of Ouargla during the year 2022 and the first two months of 2023 is approximately 12.8% (41 out of 320 children). It is worth to mention that it is difficult to make a direct comparison with previous literature as there is limited data available on the prevalence of stuttering in the general population of Algeria, let alone in preschool children in the Willaya of Ouargla specifically. However, some studies have reported that the prevalence of stuttering in preschool children can range from 1% to 11% globally (Khatoon, Mumtaz, N., & Saqulain, G., 2020). This indicates that the prevalence found in Ouargla falls within the reported range, although it is at the higher end.

It is important to note that the prevalence of stuttering can vary depending on the age of the sample, the definition of stuttering and the method of identifying stuttering (Yairi & Ambrose, 2013). It is also possible that the prevalence of stuttering in Ouargla is underestimated if there are cultural or linguistic factors that may influence the diagnosis or reporting of stuttering.

In any case, the high prevalence of stuttering in preschool children in Ouargla suggests that there may be a need for increased awareness and resources for stuttering assessment and treatment in the region. Early identification and intervention for children who stutter can have a significant impact on their communication development and overall quality of life.

6.1.1.2 Gender

As illustrated in Table 2, it can be seen that the percentage of males who stutter is higher (65.85%) compared to females (34.15%). The chi-square test revealed that there is a statistically significant difference between the two groups ($\chi 2 = 3.95$, $P\alpha = .04687$). The odds ratio (OR) is 1.94 with a male-to-female ratio of 2:1, which means that males are almost two times more likely to stutter compared to females. However, the 95% confidence interval (CI) for the OR ranges from 1 to 3.77, which indicates that the true value of the OR could lie anywhere in this range with a certain level of confidence. The relative risk (RR) is 1.83, which means that males are 1.83 times more likely to stutter compared to females.

Table 2.

Parameters	Modality	Presence of stuttering	Percent-ages (%)	χ^2	Pα	OR	95% CI (OR)	RR
Gender	Male	11.5	65,85	3.95	.046871	1.94	1-3.77	1.83
	Female	6.28	34,15					

A substantial gender bias for stuttering has been documented in the literature consistently throughout history, with male-to-female ratio of 4:1 or higher (Yairi & Ambrose, 1999; Yairi & Ambrose, 2013). Yet, on closer inspection, it seems that the gender ratios are very minimal, or even insignificant, close to the age of onset. In so saying, the finding that males are more likely to stutter than females is consistent with previous research. According to a meta-analysis of 36 studies conducted by Yairi and Ambrose (2013), the male-to-female ratio for stuttering ranges from 1.5:1 to 4:1 across different age groups and cultures. This suggests that gender is indeed a risk factor for stuttering, with males being more susceptible to the disorder. However, the reason for this gender difference is still not well understood and may involve a complex interplay between biological, environmental, and social factors.

6.1.1.3 Race and Ethnicity

According to Table 3, there is a statistically significant relationship between race/ethnicity and stuttering. The prevalence of stuttering was higher among white children (22.08%) compared to black children (3.32%). The odds ratio (OR) for stuttering among white children was 8.26 times higher than among black children. Additionally, the relative risk (RR) of stuttering among White children was 6.65 times higher than among Black children.

Table 3.

Ethnicity and Stuttering

Parameters	Modality	Presence of stuttering	χ^2	Pα	OR	95% CI (OR)	RR
Ethnicity	White	22.08	31.42	< .00001	8.26	3.55-19.21	6.65
	Black	3.32					

This finding is consistent with previous literature that has shown a higher prevalence of stuttering among White children compared to Black children (Bloodstein & Ratner, 2008). However, the reasons for this racial/ethnic difference are not fully understood. It has been suggested that genetic factors, cultural differences, and environmental factors may contribute to this difference (Yairi & Ambrose, 2013).

6.1.1.4 Age of Onset

The results from Table 4 show that the prevalence of stuttering is higher in the 2-3 years age group (14.38%) compared to the 4-5 years age group (9.13%). However, the chi-square test showed that this difference is not statistically significant ($\chi 2 = 2.42$, $P\alpha = .119795$).

The odds ratio (OR) for stuttering in the 2-3 years age group compared to the 4-5 years age group is 0.6, indicating that the odds of stuttering are 40% lower in the 2-3 years age group. The 95% confidence interval (CI) for the OR ranges from 0.31 to 1.15, indicating that the true OR could be anywhere within this range with 95% confidence. Additionally, the relative risk (RR) is 0.63, indicating that the risk of stuttering is 37% lower in the 2-3 years age group compared to the 4-5 years age group. Overall, the results suggest that age of onset may not be a significant risk factor for stuttering, at least not in the age range examined in this study.

Table 4.

Age of Onset

Parameters	Modality	Presence of stuttering	Percentages (%)	χ^2	Pα	OR	95% CI (OR)	RR
Age of onset	2-3	14.38	51,22	2.42	.119795	0.6	0.31-1.15	0.63
	4-5	9.13	48,78					

However, it is important to note that the relationship between the age of onset of stuttering and persistence of stuttering is complex and not fully understood. While early onset of stuttering has been linked to a higher likelihood of recovery, some studies have found that a later onset of stuttering may also be associated with greater risk of persistent stuttering (Yairi & Ambrose, 2013). Additionally, other factors such as the severity and type of stuttering, family history, and co-occurring conditions may also play a role in the persistence of stuttering (Bloodstein & Ratner, 2008).

6.1.1.5 Social Factors: Socioeconomic Status and Parents' Level of Education

From the data obtained, the relationship between the occurrence of stuttering and the SES of the family appears to be strong. Table 5 shows that the majority of children in the study come from families with low to medium socioeconomic status, with only 2.44% of families having a high socioeconomic status. In addition, Table 5 shows that the prevalence of stuttering is higher among children from families with low to medium socioeconomic status, with a statistically significant difference between the two groups. The odds ratio suggests that children from families with low to medium socioeconomic status are 7.85 times more likely to stutter than those from families with a high socioeconomic status. This finding is consistent with previous research that has shown a correlation between low socioeconomic status and higher prevalence of stuttering.

Table 5.

Stuttering and Socio-Economic-Status

Parameters	Modality	Presence of stuttering	Percentages (%)	χ^2	Pα	OR	95% CI (OR)	RR
SES	Low-Medium	15.97	97,56	15.37	.000088	7.85	2.37-25.97	6.76
	High	2.36	2,44					

Moreover, it appears in the current study that the father's level of education is associated more with stuttering based on the fact that 39 % of CWS have fathers with high education level and 90 % with at least a level that ranged from middle to high education level whereas the mother's level of education seems to be less strongly associated with stuttering with 80 % of mothers that have at least a level that is middle, secondary, or high education (29.3 %, 24.4 %, and 29.3 % respectively). These results do not go with the same trend to previous studies that favor the strong correlation between the mother's level of education and stuttering.

The majority of parents in the study have a marital status of marriage, with only 14.64% having a marital status of divorce. Moreover, children whose parents are divorced have a higher prevalence of stuttering compared to those whose parents are married, although the difference is not statistically significant. The odds ratio suggests that children whose parents are divorced are 2.11 times more likely to stutter than those whose parents are married. This finding is in the same line with several recent studies that reported that children with a history of family instability (e.g., parental separation/divorce, frequent moves) were more likely to stutter than those without such a history (Ambrose et al., 2015; Chang and Zhu, 2013)

6.1.1.6 Health Factors: Asthma

As shown in Table 6, there is a significant relationship between the presence of stuttering and child medical history of asthma ($\chi 2 = 4.65$, $P\alpha = 0.031054$). The odds ratio (OR) for children without asthma is 0.42 (95% CI: 0.15-0.93), indicating that children with a medical history of asthma are less likely to stutter than children without asthma. The relative risk (RR) for children without asthma is 0.38.

In the literature, it has been reported that health history has not been ade-

Table 6.

Stuttering and Asthma

Parameters	Modality	Presence of stuttering	χ^2	Pα	OR	95% CI (OR)	RR
Child Medical History: Asthma	Yes	5.66	4.65	.031054	0.42	0.15-0.93	0.38
	No	13.51					

quately documented in prior studies of the factors that may be associated with the onset of developmental stuttering (Cavenagh, Costelloe, Davis, & Howell, 2015). According to authors, asthma as a risk factor for stuttering has been indeed studied in the few past studies, but no conclusive correlation has been established. Rustin and Purser (1991) highlighted in their study that 11% of CWS have diagnosed with asthma. As a result, this finding is in contrast to some previous studies that have suggested a positive association between asthma and stuttering. However, other studies have found no significant relationship between the two. It is important to note that this study only examined the medical history of asthma, and did not investigate the severity or treatment of asthma. It is possible that more severe cases of asthma could have a stronger relationship with stuttering.

6.1.2 Etiological Factors

The etiology of stuttering has been an elusive topic for researchers and clinicians for decades. Despite the advances in our understanding of the disorder, the exact cause of stuttering remains unclear. Nevertheless, several factors have been suggested as potential etiological factors of stuttering. These include genetic factors, environmental factors, psychological factors, and linguistic factors. The pre-

sent study aims to shed light on some of these factors by investigating their potential association with the onset of stuttering in preschool children in the willaya of Ouargla, Algeria.

6.1.2.1 Parenting Styles/Stress

The results shown in Table 7 indicate that 14.70% of children with stuttering had experienced psychological trauma, while 85.30% had not. In terms of parental punishment, 31.70% of children with stuttering had experienced punishment, while 68.30% had not. Table 7 also provides further insights into the relationship between psychological trauma, parental punishment, and stuttering. The table shows that children who experienced psychological trauma had a lower incidence of stuttering (11.76%) compared to those who did not (28%). The difference was statistically significant with a p-value of 0.000605. The odds ratio of experiencing stuttering was 0.31 (95% CI: 0.15-0.62) for children who experienced psychological trauma compared to those who did not. On the other hand, children who experienced parental punishment had a significantly higher incidence of stuttering (37.5%) compared to those who did not (8.71%). The difference was statistically significant with a p-value of <0.00001. The odds ratio of experiencing stuttering was 6.29 (95% CI: 2.8-14.15) for children who experienced parental punishment compared to those who did not.

Table 7.

Stuttering and Parent Punishment and Psychological Trauma

Parameters	Modality	Presence of stuttering	Percentages (%)	χ^2	Pα	OR	95% CI (OR)	RR
Parent punishment	Yes	37.5	31,70	24.27	< .00001	6.29	2.8-14.15	4.31
	No	8.71	68,30					
Psychological trauma	Yes	11.76	14.70	11.76	.000605	0.31	0.15-0.62	0.35
	No	28	85.30%					

From a psychological point of view, the diagnosogenic theory of stuttering suggests that the amount of pressure children experience has a major impact on whether or not they stutter (Bloodstein, 1995). Past studies have associated several

stressors, such as strict or critical parents and social pressure to succeed, to children's stuttering (Moncur, 1952; Darley, 1955; Johnson, 1956). Although the findings from these studies have been inconsistent and occasionally at odds, they do seem to indicate that stress plays a part in triggering development of stuttering in children.

Overall, the evidence suggests that there may be a relationship between parental punishment and stuttering, with children who experience punishment being more likely to develop stuttering. The finding of the current study goes with the same voice of the advocates of the anticipatory struggle behavior theory that suggests that parental punishment is the cause of stuttering. In contrast, the evidence suggests that there may be a protective effect of psychological trauma on the onset of stuttering, with children who experience trauma being less likely to develop stuttering. It should be noticed that these results, about the possible relationship between stuttering and past psychological trauma, do not flow in the same vein with the breakdown theory that advocates that stuttering is caused by the interaction between an external stress, such as the experience of a psychological trauma, and a neuro-physiological predisposition of the child to have stuttering as a condition.

6.1.2.2 Family History

In order to assess the role of heredity in our population, the questionnaire asked about the notion of consanguinity between the two parents, that is to say whether the two parents are related to each other or not. Furthermore, the questionnaire has inquired about the family history of stuttering in both maternal and fraternal sides and also in the siblings. As shown in Table 8, the data indicates that 56.1% of individuals who stutter did not have any family history of stuttering. However, 26.8% of individuals who stutter reported a positive family history of stuttering on their father's side, and 14.6% on their mother's side. Additionally, 2.4% reported having a sibling who stutters.

Table 8. *Family History and Stuttering*

Stuttering History	Frequency	Percentage (%)
Father Side	11	26.8
Mother Side	6	14.6
Siblings	1	2.4
None	23	56.1

The data on consanguinity shows that the presence of stuttering is slightly higher in individuals with consanguinity (12.84%) compared to those without (11.23%). However, the chi-square test indicates that this difference is not statistically significant (p=0.13). The odds ratio (OR) is 0.54, which means that the odds of stuttering are lower in individuals with consanguinity than in those without, but this association is not statistically significant. The relative risk (RR) is 0.58, which means that individuals with consanguinity are 0.58 times as likely to develop stuttering compared to those without consanguinity. This suggests that consanguinity may not be a significant risk factor for stuttering in this population.

Through the literature, strong evidence for the genetic predisposition for stuttering has been found in a number of study fields, including family studies, twin studies, and molecular research (Yairi and Ambrose, 2012). Even though the underlying genetic mechanisms are not fully known, it is generally acknowledged that genetics has a role in the onset of stuttering. It is reported in several studies that 50% of stutterers have a family history of stuttering.

Overall, the obtained data suggests that family history and heredity may play a role in the onset of stuttering, but it is not the only factor. The fact that more than half of the individuals who stutter did not report any family history of stuttering indicates that other factors such as environmental, developmental, or psychological factors may also contribute to the onset of stuttering. It is important to note that having a family member who stutters does not guarantee that an individual will also develop a stutter. Genetics are complex and multiple genes may be involved in the development of stuttering.

6.1.3 Language and Stuttering

The present study not only aimed to explore the epidemiological and etiological factors of stuttering in the willaya of Ouargla, but also investigated the relationship between stuttering and other language disorders, as well as the possible association between bilingualism and stuttering. This section of the report delves into the results and discussion of these factors. Specifically, it examines the prevalence of co-occurring language disorders among individuals who stutter, and whether bilingualism may increase the risk of stuttering.

6.1.3.1 Concomitant language disorders

Table 9 displays the frequency and percentage of co-occurring language disorders with stuttering obtained in the present study. The data indicates that out of the total of 41 participants, 8 (19.5%) had co-occurring language disorders. Dyslexia was present in 3 (7.3%) participants, while apraxia was found in 5 (12.2%) participants. The Chi-square test indicates that the relationship between stuttering

and other language disorders is significant (p = 0.0025). The odds ratio (OR) of having a concomitant language disorder for children with stuttering is 3.68, and the 95% confidence interval (CI) ranges from 1.5 to 9.01. The relative risk (RR) is 2.92, which means that children with stuttering are almost three times more likely to have other language disorders.

Table 9.

Concomitant Language Disorders and Stuttering

Concomitant language disorders	Number	Percentage %
Dyslexia	3	7.3
Apraxia	5	12.2
Total with speech problem	8	19.5
No other speech problem	33	80.5
Total	41	100.0

The co-occurrence of other language disorders with stuttering has been widely reported in previous studies (Blood et al., 2003; Ntourou et al., 2011; Wingate, 2002). It has been suggested that stuttering may be related to deficits in phonological processing, which can lead to co-occurring language disorders such as dyslexia and apraxia. Additionally, studies have shown that children who have both stuttering and another language disorder may have a more severe stuttering condition, which could lead to more negative social and psychological effects.

The current findings suggest that there may be a relationship between stuttering and other language disorders, as they often co-occur in children. Language disorders refers to difficulties in producing or comprehending language, including problems with grammar, vocabulary, or syntax. It is also possible that the co-occurrence of stuttering and other language disorders may be due to shared risk factors, such as genetics or environmental factors. For example, children with a family history of language disorders may be more likely to develop both stuttering and other language disorders. Alternatively, children with stuttering may experience difficulty processing language, leading to difficulties with language comprehension and production.

6.1.3.2 Stuttering and Bilingualism

As summarized in Table 10, out of the total studied population, 85.36% of participants were bilingual, and 18.92% of bilingual participants had a stuttering problem. In contrast, only 3.33% of monolingual participants had a stuttering problem. The chi-square value for the relationship between language and stuttering was 22.23 with a p-value of less than 0.00001, indicating a significant association between the two. The odds ratio (OR) for stuttering in bilingual participants compared to monolingual participants was 6.77 (95% CI 2.77-16.54), indicating that the risk of stuttering was almost 7 times higher for bilingual individuals. The relative risk (RR) was 5.68, indicating that bilingualism increased the risk of stuttering by a factor of 5.68.

Table 10.

Stuttering and Bilingualism

Parameters	Modality	Presence of stuttering	Percentages (%)	χ^2	Pα	OR	95% CI (OR)	RR
Language	Bilingual	18.92	85,36	22.23	< .00001	6.77	2.77-16.54	5.68
	Monolingual	3.33	14,64					

Literature on the effect of bilingualism on the onset and the course of stuttering is conflicting. Some researchers have proposed that the increased linguistic demands of being bilingual could create more opportunities for speech disruptions and increase the likelihood of stuttering (Eisenson, 1984; Karniol, 1992; Mattes & Omark, 1991; Shames, 1989). This direction is mainly supported by the demands and capacities model. On the other hand, some recent studies have found that bilingualism could have a protective effect against stuttering, possibly due to the increased cognitive and linguistic flexibility associated with learning and using multiple languages (Kornisch, 2021).

In the present study, the findings are in the same line with the first direction that advocates that bilingualism indeed increase the risk of stuttering. In so saying, these findings suggest that bilingualism might be a risk factor for stuttering. However, it is important to note that the study does not establish a causal relationship between the two variables, and other factors such as age, ethnicity, and gender could be confounding variables.

6.2 Recapitulation

Recapitulating what has been discussed above, the results of the present study showed a high prevalence of stuttering in Ouargla, with males being almost two times more likely to stutter compared to females. Additionally, the prevalence of stuttering was higher among White children compared to Black children. The results also showed that while the prevalence of stuttering was higher in the 2-3-year age group compared to the 4-5-year age group, this difference was not statistically significant. However, socioeconomic status was found to have a strong correlation with stuttering, with children from low to medium SES families being more likely to stutter.

Additionally, fathers' education level was found to be more strongly associated with stuttering than mothers' education level, which was contrary to previous studies. Children whose parents were divorced also had a higher prevalence of stuttering, although this difference was not statistically significant. Moreover, there was a significant relationship between medical history of asthma and stuttering, with children without asthma being more likely to stutter than those with asthma. The study also explored other possible factors contributing to stuttering, including parenting styles and family history. Results showed that parental punishment was significantly associated with higher incidence of stuttering in children, while experiencing psychological trauma was associated with a lower incidence. Family history of stuttering was reported by a minority of individuals who stutter, suggesting that while heredity may play a role, other factors such as environmental or psychological factors may also contribute to stuttering.

Furthermore, the present study examined the relationship between stuttering and other language disorders, as well as the possible association between bilingualism and stuttering. The results indicated that there was a significant relationship between stuttering and other language disorders, with a relatively high percentage of participants having co-occurring language disorders. The study also found that bilingualism may increase the risk of stuttering, with a much higher percentage of bilingual participants having a stuttering problem compared to monolingual participants. However, it is important to note that the study does not establish a causal relationship between bilingualism and stuttering, and other factors such as age, ethnicity, and gender could be confounding variables.

All in all, the results of the study suggest that there are multiple factors that may contribute to the development of stuttering, including genetics, environmental factors (such as socioeconomic status and parenting styles), and language disorders. As shown in Figure 1, the study also suggests that the relationship between these factors and stuttering is complex and that there may be interactions between

them. Therefore, the multifactorial nature of stuttering is supported by the findings of this study.

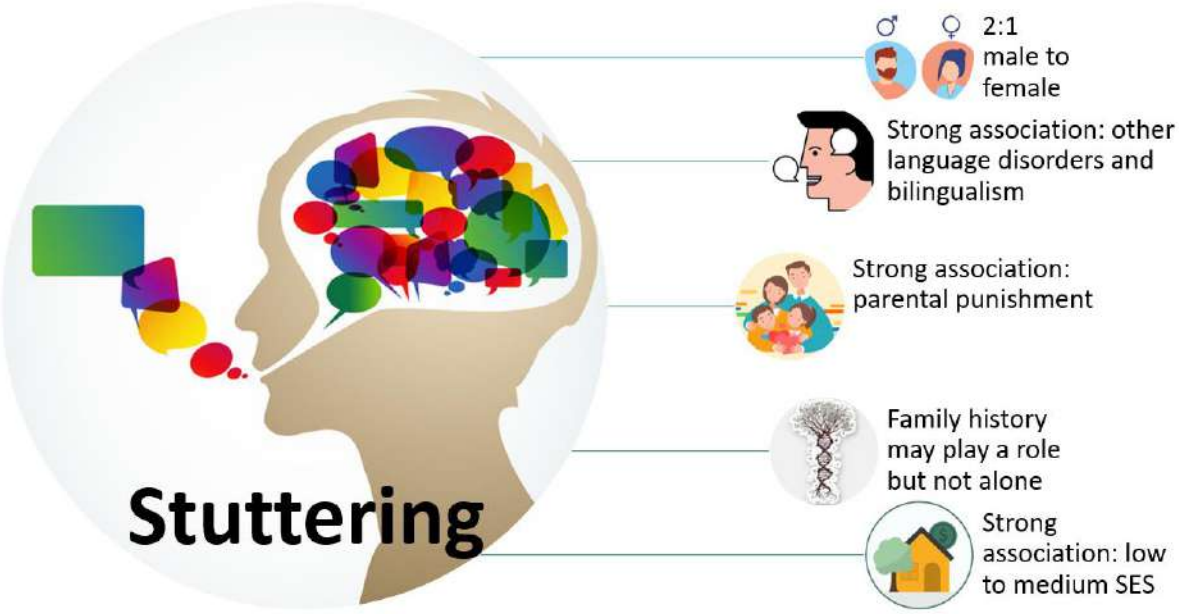

Figure 1. *Recapitulation of the Major Factors Associated with the Onset of Stuttering*

Conclusion

In conclusion, the results obtained from the present study provide significant insight into the prevalence of stuttering in Ouargla, Algeria, and the factors associated with its onset. They showed a higher prevalence of stuttering among males and children from low to medium SES families. The study also found a significant relationship between stuttering and co-occurring language disorders and highlighted the potential association between bilingualism and stuttering. Furthermore, the study explored other possible factors contributing .to stuttering, such as parenting styles, family history, and concluding that stuttering is affected by these factors. These findings have implications for early intervention and prevention of stuttering in the preschool-aged population in Ouargla. However, further studies are needed to investigate the causal relationship between bilingualism and stuttering and to identify other factors that may contribute to the onset of stuttering in this population. Overall, the present study contributes to a better understanding

of the factors associated with this speech disorder and highlights the importance of early intervention to confirm its diagnosis of stuttering and determine its prognosis.

General Conclusion

Stuttering is a relatively common speech disorder that affects approximately 1% of the population worldwide. It is more prevalent in males than females. The onset of stuttering typically occurs between the ages of 2 and 3.5 years old, with the majority of cases resolving spontaneously before adulthood. However, in some cases, stuttering persists into adulthood and can significantly impact an individual's quality of life. Stuttering can also occur in individuals who are bilingual or multilingual, and research in this area is ongoing. Overall, the epidemiology of stuttering highlights the importance of early detection and intervention to reduce the risk of long-term impairment.

This study aimed to investigate the factors that might trigger the onset of stuttering in preschool children in the wilaya of Ouargla, Algeria. The study identified several potential factors that could contribute to the onset of stuttering, including family history, male gender, and parenting style. Moreover, the study shed light on the significant relationship between stuttering and language, particularly bilingualism, which requires further research. The ultimate goal of this research was to provide speech therapists with the necessary tools to predict the onset of stuttering and act quickly, emphasizing the importance of early intervention to reduce the risk of persistent stuttering.

This study contributes to the limited literature on stuttering in Algeria and underscores the need for raising awareness among parents and educators about the importance of seeking professional help for stuttering children, as prevention is the best cure.

Limitations of the Study

Any research has its limitations, including the current study. First, the study used a retrospective design, which is subject to recall bias. Parents may not accurately remember the early childhood experiences of their children, particularly those related to parenting style and family history of stuttering. Second, the study was conducted in a specific geographical area (willaya of Ouargla, Algeria), and the results may not be generalizable to other populations. Third, the sample size of the study was relatively small, which may limit the power of the statistical analyses and the generalizability of the findings. Fourth, the study relied solely on self-report data obtained via a questionnaire, which may be subject to social desirability bias. Finally, the study did not examine the impact of stuttering on children's academic and social functioning, which is an important area for future research.

Recommendations and Clinical Implications

Based on the results of this study, there are several recommendations and clinical implications for speech therapists and families of children who stutter. Firstly, parents and teachers should be made aware of the high prevalence of stuttering in Ouargla region, and the importance of early intervention for children who stutter. Speech therapists should also be trained and available to diagnose and treat stuttering in children as early as possible. Additionally, socioeconomic status was found to be strongly correlated with stuttering, highlighting the need for interventions that address the impact of poverty on child development, including access to healthcare and education.

The study also revealed the relationship between language disorders and stuttering, with a high percentage of participants exhibiting co-occurring language disorders. Therefore, speech therapists should consider a comprehensive evaluation of a child's language skills in addition to their fluency when assessing for stuttering. The association between bilingualism and stuttering should also be explored further, with a focus on the potential impact of language dominance, age of acquisition, and language switching on the onset and severity of stuttering.

Finally, the study highlighted the importance of positive parenting practices in reducing the risk of stuttering. Parental punishment was found to be associated with a higher incidence of stuttering in children, while experiencing psychological trauma was associated with a lower incidence. Therefore, speech therapists should educate parents on effective parenting practices that support healthy child development, including positive reinforcement, active listening, and problem-solving strategies.

Overall, this study provides valuable insights into the epidemiological and etiological factors associated with stuttering in Ouargla region. Speech therapists and families of CWS can use these findings to improve early detection and intervention, address socioeconomic disparities, and promote positive parenting practices that support healthy language development and reduce the risk of stuttering.

Perspectives for Future Studies

Based on the results above, there are several perspectives and suggestions for further research:

Further investigation of the relationship between socioeconomic status and stuttering: Although the present study found a significant correlation between lower SES and higher incidence of stuttering, it is important to investigate this relationship further to determine the underlying factors contributing to this association. Future studies could explore the potential role of environmental factors, such as exposure to stress and trauma, in the development of stuttering.

Exploration of the role of bilingualism in stuttering: The present study found a higher prevalence of stuttering among bilingual participants, suggesting a potential link between bilingualism and stuttering. Future research could further investigate this relationship, examining factors such as age of acquisition of a second language, language dominance, and cultural factors that may affect the development of stuttering in bilingual individuals.

Investigation of the impact of psychological trauma on stuttering: The present study found a lower incidence of stuttering among individuals who had experienced psychological trauma. This finding is in contrast to previous research suggesting a potential link between trauma and stuttering. Future studies could explore this relationship further, examining factors such as the type and severity of trauma, as well as individual differences in resilience and coping mechanisms.

Exploration of the impact of parenting styles on stuttering: The present study found a significant association between parental punishment and higher incidence of stuttering in children. Future research could further investigate this relationship, examining the potential impact of other parenting factors such as warmth, sensitivity, and consistency on the development and persistence of stuttering in children.

Overall, further research is needed to better understand the epidemiological, etiological, and clinical factors that contribute to the development and persistence of stuttering, particularly in underrepresented communities such as Ouargla, Algeria. Such research will not only deepen our understanding of stuttering as a disorder, but also inform early intervention and prevention strategies for individuals at risk of developing stuttering.

Bibliographical / References

Ambrose, N. G. (2004). Theoretical perspectives on the cause of stuttering. Contemporary Issues in Communication Science and Disorders, 31, 80-91.

Ambrose, N. G. (2006). Early stuttering: Parent counseling. In N. B. Ratner & J. Tetnowski (Eds.), Current issues in stuttering research and practice (pp. 87-98). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Ambrose, N. G., Yairi, E., & Cox, N. (1993). Genetic aspects of early childhood stuttering. Journal of Speech, Language and Hearing Research, 36(4), 701.

Amrani, Z & Aiouadj, S. (2020). Thona'eyt al-logha w al-tatah 'end al-tifl [Bilingualism and Stuttering in Children]. Batna, Algeria: Majelat el-eloom al-ajtima'eyah w al-ensanyah, jam'et Batna 1

Arndt, J., & Healey, E. C. (2001). Concomitant disorders in school-age children who stutter. Language, Speech, and Hearing Services in Schools, 32, 68-78.

Biermann-Ruben, K., Salmelin, R., & Schnitzler, A. (2005). Right rolandic activation during speech perception in stutterers: A MEG study. NeuroImage, 25, 793-801.

Bosshardt, H. (2002). Effects of concurrent cognitive processing on the fluency of word repetition: Comparison between persons who do and do not stutter. Journal of Fluency Disorders, 27, 93-114.

Blood, G. W., Ridenour, V. J., Qualls, C. D., & Hammer, C. S. (2003). Co-occurring disorders in children who stutter. Journal of Communication Disorders, 36(6), 427-448.

Bloodstein, O. A handbook on stuttering. San Diego: Singular; 1995.

Bloodstein, O., & Bernstein Ratner, N. (2008). A Handbook on Stuttering (6th ed.). Clifton Park, NY: Delmar.

Boyle C, Boulet S, Schieve L, Cohen R, Blumberg S, Yeargin-Allsopp M, Visser S, Kogan M. Trends in the Prevalence of Developmental Disabilities in US Children, 1997–2008. Pediatrics. 2011; 34:385–395.

Brown, S. (1945). The locus of stuttering in the speech sequence. Journal of Speech Disorders, 10, 181-192.

Buchel, C., & Sommer, M. (2004). What causes stuttering? PLoS Biology, 2(2), 159-163.

Chang, S., & Zhu, D. Z. (2013e). Neural network connectivity differences in children who stutter. Brain. https://doi.org/10.1093/brain/awt275

Comings, D. E., Wu, S., Chiu, C., Ring, R. H., Gade, R., Ahn, C., . . . Muhleman, D. (1996). Polygenic inheritance of Tourette syndrome, stuttering, attention deficit hyperactivity, conduct, and oppositional defiant disorder: The additive and subtractive effect of the three dopaminergic genes - DRD2, DPH, and DAT1. American Journal of Medical Genetics (Neuropsychiatric Genetics), 67(264-288).

Conture, E. G. (2000). *Stuttering* (3rd Ed). Needham Heights, MA: Allyn & Bacon.

Costa, D., & Kroll, R. (2000). Stuttering: An update for physicians. Canadian Medical Association Journal, 162(13), 1849-1855.

Craig, A., & Tran, Y. (2006). Fear of speaking: chronic anxiety and stammering. *Advances in Psychiatric Treatment*, 12, 63-68.

Creswell, J. W., & Creswell, D. J. (2018). Research Design: Qualitative, Quantitative, and Mixed Methods Approaches (5th ed.). SAGE Publications, Inc.

Dale, P. (1977). Factors related to disfluent speech in bilingual Cuban-American adolescents.

Journal of Fluency Disorders, 2, 311-314.

De Nil, L. (1999). Stuttering: A neurophysiologic perspective. In N. Bernstein Ratner & E. C. Healey (Eds.), Stuttering research and practice: Bridging the gap (pp. 85- 102). Mahwah, NJ: Lawrence Erlbaum.

Darley, F. L. (1955). The relationship of parental attitudes and adjustments to the development of stuttering. In W. Johnson, & R.R. Leutenegger (Eds.), Stuttering in Children and Adults. Minneapolis, MN: University of Minnesota Press.

Dworzynski, K., Remington, A., Rijsdijk, F., Howell, P., & Plomin, R. (2007). Genetic etiology in cases of recovered and persistent stuttering in an unselected, longitudinal sample of young twins. American Journal of Speech-Language Pathology, 16, 169-178.

Eisenson, J. (1984). Stuttering as an expression of inefficient language development. In L. J. Raphael, C. B. Raphael & M. R. Vasovinos (eds), Language and Cognition: Essays in Honor of Arthur Bronstem (New York: Plenum).

Eskandari A, Hallaj A, Shafi'ei B. The Investigation of Relationship between Stuttering and Some of Allergic Diseases in Isfahan in 1380-81. jrehab. 2003; 3 (4) :15-19 URL: http://rehabilitationj.uswr.ac.ir/article-1-577-en.html

Fox, P. T., Ingham, R. J., Ingham, J. C., Zamarripa, F., Xiong, J.-H., & Lancaster, J. L. (2000). Brain correlates of stuttering and syllable production: A PET performance-correlation analysis. Brain, 123, 1985-2004.

Fogle, P. T. (2012). Essentials of communication sciences & disorders. Clifton Park, NY: Delmar Cengage Learning.

Gottwald, S. R., & Starkweather, C. W. (1995). Fluency intervention for preschoolers and their families in public schools. Language, Speech, and Hearing in Schools, 26, 117-126.

Guitar, B. (2014). Stuttering: An integrated approach to its nature and treatment (4th ed.). Baltimore, MD: Lippincott Williams & Wilkins.

Hess, D. R. (2004). Retrospective studies and chart reviews. Respiratory Care, 49(10), 1171–1174.

Howell, P. (2013). Screening school age children for risk of stuttering. *Journal of Fluency Disorders*, 38, 97–118.

Ingham, R. J., Fox, P. T., Ingham, J. C., Xiong, J., Zamarripa, F., Hardies, L. J., & Lancaster, J. L. (2004). Brain correlates of stuttering and syllable production: Gender comparison and replication. Journal of Speech, Language and Hearing Research, 47, 321-341.

Ivoskuviene, R., & Makauskiene, V. (2009). Experiences of teachers working with children who stammer. Specialusis Ugdymas, 1(20), 93-100.

Johnson, W. (1956). Perceptual and evaluational factors in stuttering. Folia Phoniatrica Et Logopaedica, 8(4), 211-233.

Jones, M., Onslow, M., Packman, A., O'Brian, S., Hearne, A., Williams, S., Ormond, T., & Schwarz, I. (2008). Extended follow-up of a randomized controlled trial of the Lidcombe Program of Early Stuttering Intervention. *International Journal of Language and Communication Disorders*, 7, 1-13.

Kornisch, M. (2021d). Bilinguals who stutter: A cognitive perspective. Journal of Fluency Disorders, 67, 105819. https://doi.org/10.1016/j.jfludis.2020.105819

Kumar, R. (2010). Research Methodology: A Step-by-Step Guide for Beginners (Third). SAGE Publications Ltd.

Kalat, J. W. (2007). Biological psychology (9th ed.). Belmont, CA: Thomson Wadsworth.

Karniol, R. (1992). Stuttering out of bilingualism. First Language, 12, 255 – 283.

Kraft, S. J., & Yairi, E. (2012). Genetic bases of stuttering: The state of the art, 2011. Folia Phoniatrica et Logopaedica, 64(1), 34-47.

Last, J. M. (2000). A Dictionary of Epidemiology (4th ed.). Oxford University Press.

Lattermann, C., Shenker, R. C., & Thordardottir, E. (2005). Progression of language complexity during treatment with the Lidcombe program for early stuttering intervention. American Journal of Speech-Language Pathology, 14, 242-253.

Lebrun, Y., & Paradis, M. (1984). To be or not to be an early bilingual? In: Y. Lebrun, & M. Paradis (Eds.), Early bilingualism and child development. Lisse: Swets & Zeitlinger, pp. 9 – 18.

Lewis, C., Packman, A., Onslow, M., Simpson, J. M., & Jones, M. (2008). A phase II trial of telehealth delivery of the Lidcombe program of early stuttering intervention. American Journal of Speech-Language Pathology, 17, 139-149.

MacNamara, J. (1972). Cognitive basis of language learning in infants. Psychological Review, 79, 1-14.

Magiste, E. (1979). The competing language systems of the multilingual: a developmental study of encoding and decoding processes. Journal of Verbal Learning and Verbal Behavior, 18, 79-89.

Manning, W. H. (2010). Clinical decision making in fluency disorders (3rd ed.). Clifton Park, NY: Delmar.

Mansson, H. (2000). Childhood stuttering: Incidence and development. *Journal of Fluency Disorders*, 25, 47–57.

Mattes, L. J. & Omark, D. R. (1984). Speech and Language Assessment for the Bilingual Handicapped (San Diego, CA: College Hill Press).

Mattes, L. J., & Omark, D. R. (1991). Speech and language assessment for the bilingual handicapped. San Diego: College-Hill Press.

Millard, S. K., Nicholas, A., & Cook, F. M. (2008). Is parent-child interaction therapy effective in reducing stuttering? Journal of Speech, Language, and Hearing Research, 51, 636-650.

Moncur, J. (1952). Parental domination in stuttering. Journal of Speech and Hearing Disorders, 17, 155-165.

Montgomery, C. S. (2006). The treatment of stuttering: From the hub to the spoke. In N. B.

Newbury, D. F., & Monaco, A. P. (2010). Genetic advances in the study of speech and language disorders. Neuron, 68(2), 309-320.

Ntourou, K., Conture, E. G., & Lipsey, M. W. (2011). Language abilities of children who stutter: A meta-analytical review. American Journal of Speech-Language Pathology, 20, 163-179.

Onslow, M. (2004). Treatment of stuttering in preschool children. Behaviour Change, 21(4), 201-214.

Olander, L., Smith, A., & Zelaznik, H. N. (2010). Evidence that a motor timing deficit is a factor in the development of stuttering. Journal of Speech, Language, and Hearing Research, 53, 876 886.

Postma, A., & Kolk, H. (1993). The covert repair hypothesis: Prearticulatory repair in normal and stuttered disfluencies. Journal of Speech and Hearing Research, 36, 472-487.

Proctor A, Yairi E, Duff M. Prevalence of stuttering in African American preschool children. Journal of Speech, Language, and Hearing Research. 2008; 50:1465–1474.

Ramig, P. R., & Dodge, D. M. (2010). The child and adolescent stuttering treatment and activity resource guide (2nd ed.). Clifton Park, NY: Delmar Cengage Learning.

Ratner & J. Tetnowski (Eds.), Current issues in stuttering research and practice (pp. 159-204). Mahwah, NJ: Lawrence Erlbaum Associates Inc.

Ratner, N. (1997). Stuttering: A psycholinguistic perspective. In R. F. Curlee and G. M. Siegel (Eds.) Nature and Treatment of Stuttering: New Directions. Boston: Allyn & Bacon.

Redlinger, W. E. & Park, T. Z. (1980). Language mixing in young bilinguals. Journal of C hild Language, 7, 337-352.

Reilly, S., Onslow, M., Packman, A., Wake, M., Bavin, E., Prior, M., et al. (2009). Predicting stuttering onset by age of 3: A prospective, community cohort study. *Pediatrics*, 123, 270–277.

Riaz, N., Steinberg, S., Ahmad, J., Pluzhnikov, A., Riazuddin, S., Cox, N. J., & Drayna, D. (2005). Genomewide significant linkage to stuttering on chromosome 12. American Journal of Human Genetics, 76, 647-651.

Shames, G. H. (1989). Stuttering: an RFP for a cultural perspective. Journal of Fluency Disorders, 14, 67-77.

Siguan, M., & Mackay, W. F. (1987). Education and bilingualism. London: Kagan Page in association with UNESCO.

Starkweather, W. (1987). Fluency and Stuttering. Englewood Cliffs, NJ: Prentice-Hall.

Stern, E. (1948). A preliminary study of bilingualism and stuttering in four Johannesburg schools. Journal of Logopaedics, 1, 15 – 25.

Swain, M. (1972). Bilingualism as a first language. Unpublished doctoral dissertation, University of California, Berkeley.

Travis, L. E., Johnson, W., & Shover, J. (1937). The relation of bilingualism to stuttering. Journal of Speech Disorders, 2, 185 – 189.

Vihman, M. M. & McLaughlin, B. (1982). Bilingual and second language acquisition in preschool children. In C. J. Brainerd & M. Pressley (eds), Verbal Processes in Children: Progress in Cognitive Developmental Research (New York: Springer-Verlag).

Volterra, V. & Taeschner, T. (1978). The acquisition and development of language by bilingual children. Journal of Child Language, 5, 311-326.

Wingate, M. E. (2002). Foundations of stuttering. San Diego: Academic Press.

Wu, J. C., Maguire, G., Riley, G., Lee, A., Keator, D., Tang, C., . . . Najafi, A. (1997). Increased dopamine activity associated with stuttering. NeuroReport, 8, 767-770.

Yairi, E. (1983). The onset of stuttering in two- and three-year-old children: A preliminary report. Journal of Speech and Hearing Disorders, 48, 171-177.

Yairi, E., & Ambrose, N. (2005). Early childhood stuttering. Austin, TX: Pro-Ed.

Appendices

Appendix A: Questionnaire (English version)

Dear Parents:

This questionnaire is an attempt to gather information needed for the accomplishment of our master dissertation. Our goals are to document the circumstances that surround the stuttering onset and whether specific child, family, or environmental factors predict stuttering onset in children aged up to 05 years in the Algerian society and specifically in the willaya of Ouargla.

Your answers are highly important for the validity of this research. You are kindly requested to read carefully and carefully the following questions by ticking the appropriate box and adding suitable comments in full sentences whenever necessary. Please notice that your answers will be totally anonymous.

Do you accept to take part in this study? Yes □ No □

Section 01: General background

1. Gender: Male □ Female □

2.Age: 02 □ 03 □ 04 □ 05 □

3. Ethnicity: White □ Black □ Mixed □

4. Language: Monolingual □ Bilingual □

5. District of residency:

Section 02: Parents and Family

6. Are you and your partner form the same family? (Consanguinity)

Yes □ No □

7. What is the educational level of the father?

a. Primary school □ b. Middle school □ c. Secondary school □ d. High education level □ e. No educational level □

8. What is the educational level of the mother?

a. Primary school □ b. Middle school □ c. Secondary school □ d. High education level □ e. No educational level □

9. Family's socio-economic status: Low □ Medium □ High □

10. Parents' marital status: Married □ Divorced □ Widowed □

11. Language used by the parents at home:

One language □ Two languages □ More □

12. History of stuttering in the family:

Father side □ Mother side □ Siblings □ None □

Section 3: Child

13. Does the child have any medical history?

Yes □ No □

If yes, specify:

14. Does the child have any other speech problem (speech impairment)?

Yes □ No □

If yes, specify:

15. Handiness: Right handed □ Left handed □

16. How many brothers and sisters does your child have? And what is his/her position?

Section 4: The stuttering onset

17. When did you first become concerned about stuttering? How old was your child then?

18. When did stuttering begin in your child?

19. Was there any event that you can remember around the stuttering onset? (Newborn, accident, psychological event, separation, … etc.)

20. Did you take your child immediately to the speech therapist after the first episode of stuttering? Yes □ No □

21. Which among the following can you strongly associate with your child's stuttering? (Multiple answers are possible)

a. Parental punishment □

b. Language demands □

c. Start of school (kindergarten, preparatory school, or studying in the mosque) □

d. Switching between two languages (for bilingual child) □

Appendix B: Questionnaire (Arabic version)

أعزاءي الآباء والأمهات :

هذا الاستبيان هو محاولة لجمع المعلومات اللازمة لإنجاز أطروحة الماستر الخاصة بنا. تتمثل أهدافنا في توثيق الظروف المحيطة ببداية التلعثم وما إذا كانت هناك عوامل خاصة بالطفل أو الأسرة أو البيئة تتنبأ بظهور التلعثم عند الأطفال حتى سن الخامسة في المجتمع الجزائري وتحديداً في ولاية ورقلة.

إجاباتكم مهمة للغاية لصحة هذا البحث. يرجى قراءة الأسئلة التالية بعناية والإجابة عليها عن طريق وضع علامة في المربع المناسب وإضافة التعليقات المناسبة في جمل كاملة كلما لزم الأمر. يرجى ملاحظة أن إجاباتك ستكون مجهولة الهوية وسرية تمامًا.

□**هل تقبل المشاركة في هذه الدراسة؟** نعم □ لا

القسم 01: خلفية عامة

1. الجنس: ذكر □ انثى □
2. العمر: 02 □ 03 □ 04 □ 05 □
3. العرق: أبيض□ أسود □ مختلط □
4. اللغة: أحادي اللغة □ ثنائي اللغة □
5. منطقة الإقامة

القسم 02: الوالدان والأسرة

6. هل أنت وشريكك من نفس العائلة؟ (القرابة)

نعم □ لا □

7. ما هو المستوى التعليمي للأب؟

أ. المدرسة الابتدائية □ ب. المدرسة المتوسطة □ ج. المدرسة الثانوية □
د. مستوى تعليمي عال □ هـ. لا يوجد مستوى تعليمي □

8. ما هو المستوى التعليمي للأم؟

أ. المدرسة الابتدائية □ ب. المدرسة المتوسطة □ ج. المدرسة الثانوية □
د. مستوى تعليمي عال □ هـ. لا يوجد مستوى تعليمي □

9. الوضع الاجتماعي والاقتصادي للأسرة: منخفض □ متوسط □ مرتفع □

10. الحالة الاجتماعية للوالدين: متزوج □ مطلق □ أرمل □

11. اللغة المستخدمة من قبل الوالدين في المنزل:

لغة واحدة □ لغتان □ أكثر من لغتين□

12. تاريخ التلعثم في الأسرة:

جانب الأب □ جانب الأم □ الأشقاء □ لا يوجد □

القسم 3: الطفل

13. هل للطفل أي تاريخ طبي؟

نعم □ لا □

إذا كانت الإجابة بنعم، يرجى التحديد:

14. هل يعاني الطفل من أي مشكلة أخرى في النطق (ضعف الكلام) ؟

نعم □ لا□

إذا كانت الإجابة بنعم، يرجى التحديد:

15. استخدام اليد: اليد اليمنى □ اليد اليسرى □

16. كم عدد الإخوة والأخوات لطفلك؟ وما هي رتبته في العائلة؟

القسم 4: بداية التأتأة

17. متى شعرت بالقلق لأول مرة بشأن التلعثم؟ كم كان عمر طفلك بعد ذلك؟

18. متى بدأ التلعثم عند طفلك؟

19. هل كان هناك أي حدث يمكنك تذكره حول بداية التأتأة؟ (حديثي الولادة، حادث، حدث نفسي، انفصال ... إلخ)

20. هل اصطحبت طفلك فورًا إلى معالج النطق بعد نوبة التأتأة الأولى؟

نعم □ لا □

21 .أي مما يلي يمكنك ربطه بشدة بتلعثم طفلك؟ (إجابات متعددة ممكنة)

1. العقاب الأبوي □
2. مطالب اللغة □
3. بدء الدراسة (الدخول للحضانة او التحضيري او الدراسة في المسجد) □
4. عندما يغير بين لغتين (للطفل ثنائي اللغة) □

Résumé

L'étude actuelle examine les facteurs qui peuvent déclencher l'apparition du bégaiement chez les enfants d'âge préscolaire dans la wilaya d'Ouargla, en Algérie. L'étude vise à fournir aux orthophonistes un outil pour prédire l'apparition du bégaiement, permettant ainsi une intervention précoce et la prévention du bégaiement persistant. L'étude explore également la relation entre le bégaiement et la langue, y compris l'association possible entre le bilinguisme et le bégaiement. Les données ont été collectées à l'aide d'un questionnaire et comprenaient des informations sur l'histoire familiale, le traumatisme psychologique, la punition parentale, la co-occurrence avec un autre trouble de langage et le bilinguisme. L'étude analyse la fréquence et le pourcentage de chaque facteur de risque pour déterminer leur contribution potentielle à l'apparition du bégaiement. Les résultats indiquent que les facteurs génétiques, environnementaux (tels que le statut socio-économique et les styles de parentalité) et les troubles du langage peuvent tous contribuer au développement du bégaiement. L'étude suggère une relation complexe et multifactorielle entre ces facteurs et le bégaiement, soulignant la nécessité d'une intervention précoce et d'une approche holistique du traitement.

Mots-clés: Bégaiement, Enfants d'âge préscolaire, Début, Intervention précoce, Bilinguisme.

المستخلص

تستكشف الدراسة الحالية العوامل التي قد تؤدي إلى بدء تأتأة الأطفال في المرحلة الابتدائية في ولاية ورقلة في الجزائر. تهدف الدراسة إلى تزويد أخصائي علاج النطق بأداة للتنبؤ ببدء التأتأة ، مما يتيح التدخل المبكر والوقاية من التأتأة المستمرة. تستكشف الدراسة أيضًا العلاقة بين التأتأة واللغة ، بما في ذلك الارتباط المحتمل بين ثنائية اللغة والتأتأة. تم جمع البيانات من خلال استبيان وشملت معلومات عن السجل العائلي والصدمة النفسية وعقاب الوالدين والاضطرابات اللغوية المرافقة و ثنائية اللغة. تحليل تكرار ونسبة كل عامل خطر لتحديد مساهمته المحتملة في بدء التأتأة. تشير النتائج إلى أن العوامل الوراثية والعوامل البيئية (مثل الوضع الاجتماعي وأساليب التربية) واضطرابات اللغة قد تسهم جميعها في تطوير التأتأة. تشير الدراسة إلى وجود علاقة معقدة ومتعددة العوامل بين هذه العوامل والتأتأة ، مما يؤكد على الحاجة إلى التدخل المبكر والنهج الشامل للعلاج .

الكلمات الرئيسية: التأتأة ، الأطفال في المرحلة الابتدائية ، البدء ، التدخل المبكر ، التعددية اللغوي