

**GENDER DIFFERENCE IN NATURE OF DISFLUENCIES IN  
CHILDREN WITH STUTTERING**

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**Register No: 08SLP021**

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**MAY, 2010**

## CERTIFICATE

This is to certify that this dissertation entitled "*Gender difference in nature of disfluencies in children with stuttering*" is the bonafide work submitted in part fulfillment for the degree of Master of Science (Speech and Language Pathology) of the student (Registration No. 08SLP021). This has been carried out under the guidance of a faculty of this institute and has not been submitted earlier to any other University for the award of any other Diploma or Degree.

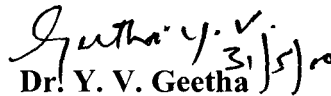
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This is to certify that the dissertation entitled "*Gender difference in nature of disfluencies in children with stuttering*" has been prepared under my supervision and guidance. It is also certified that this has not been submitted earlier in any other University for the award of any Diploma or Degree.

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Guide

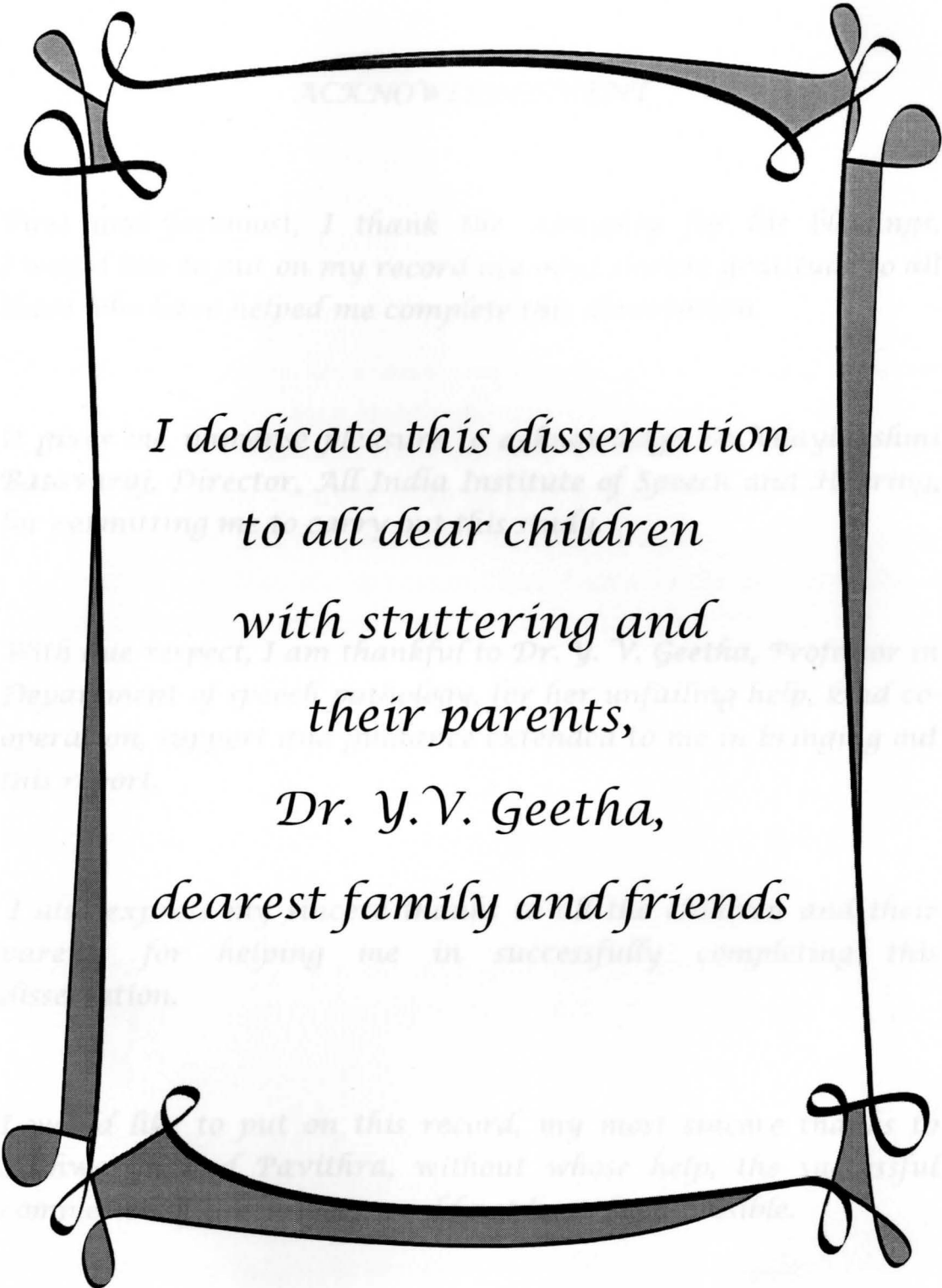
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## DECLARATION

This is to certify that this dissertation entitled “*Gender difference in nature of disfluencies in children with stuttering*” is the result of my own study under the guidance of Dr. Y. V. Geetha, Lecturer of Speech Sciences, Department of Speech-Language Sciences, All India Institute of Speech and Hearing, Mysore, and has not been submitted earlier in any other university for the award of any diploma or degree.

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May, 2010

**Register No. 08SLP021**



*I dedicate this dissertation  
to all dear children  
with stuttering and  
their parents,  
Dr. Y. V. Geetha,  
dearest family and friends*

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# CHAPTER 1

## INTRODUCTION

Stuttering, in its most basic sense is a disruption/break in the forward flow of speech and a term that is most commonly used/ recognized by most people. It has been the subject of study for decades together. However, the term stuttering is not as simple as it appears to be. The mysterious and complicated nature of the disorder can be identified by just attempting to define the condition. Various investigators have proposed various definitions for stuttering but each definition lacks in identifying or explaining some aspect of stuttering. The definition by Wingate (1964) is among the frequently cited definitions, as it describes every aspect of stuttering. Since the mid 1960's, this definition has been widely used and even today, after 50 years, it still provides the best reference point from which to consider the disorder of stuttering. However, there is still no universally accepted definition of stuttering.

Several aspects of stuttering have been closely examined through the years. However, there have been divided opinions on many aspects, with major controversy on the etiology of stuttering. In the earlier days, it was believed that stuttering was a punishment for sins committed. Later on it was believed to be a disorder of the tongue. But as science advanced, man's thinking also changed. In the 1930's, superstitious beliefs were replaced by more concrete studies. It was believed that handedness or abnormal cerebral dominance was the cause of stuttering. Later, this was connected to psychological and environmental reasons, with the negative reaction

of parents considered as a cause of stuttering. Studies have shown that genes play an important role. More recently, methods have been adopted that directly route itself to the brain of a person with stuttering. Such neuro-imaging techniques promise important revelations in the field of stuttering. There have been several shifts of beliefs from organic to functional to organic over the decades depending on the professionals who studied the disorder. The more recent beliefs among the researchers is that it is both nature and nurture or combination of organic and functional factors contributing to the onset and development of stuttering.

This disorder manifests itself predominantly in childhood, most often within 2-6 years of age. Hence it has often been described as a disorder of childhood. However, a review of literature of the late 1960's and early 1970's reveals a preponderance of research conducted on adults who stutter, with very few studies on children who stutter. Only a few decades back has stuttering in children begun to be widely investigated. Children with stuttering present a heterogeneous group, with stuttering of a highly variable nature. Investigations into different aspects of stuttering are hence difficult. Investigators have repeatedly emphasized the need for subgrouping children or adults with stuttering (CWS/AWS) for research purposes because of this heterogeneity.

Literature generally suggests stuttering to be a disorder of males. There have been various investigations carried out to arrive at such a conclusion. Gender difference in stuttering has attracted wide attention to itself. Various aspects of stuttering and the difference between the gender has been investigated. Gender ratio is one of the most influential factors. Ratios ranging from 1:1 to 10:1 have been

reported. Such a disparity in gender ratio has been of prime interest to many researchers. To unravel the mystery behind this, researchers have proposed various reasons. A difference in the reaction and responsiveness with favoritism exhibited on male children has been implicated widely in earlier literature. Current research considers females to be less susceptible to stuttering than male CWS or that they have equal chances of inheriting the disorder, but that female CWS recover faster, while male CWS tend to persist. Differences in language ability, reaction time, as well as the more recent differences in neuro-anatomical and functional changes of the brain have been implicated. Females have been considered to have an increased bilateral speech and language representation compared to males. The males are more likely to have a strong left hemisphere lateralization for speech and language. Differences in terms of age of onset, nature, development have been explained based on these factors. Female CWS are considered to have an earlier age of onset than male CWS.

Other aspects in stuttering that have been under comparison between the gender are the type of stuttering, pattern of recovery, nature and duration of treatment. Investigators have tried to explore the type of disfluencies that are more likely to be exhibited by male and female CWS. Few studies have obtained differences between the gender, with more of stuttering like disfluencies especially that of part word repetition in boys. In terms of recovery, females are found to recover earlier than male CWS.

However, mixed opinions have been voiced in relation to each of these parameters. This is partly so because majority of the studies have considered fewer number of female CWS or that their responses have been pooled together with those

of male CWS with the results being generalized to females. Very few studies have been dedicated exclusively to the study of females with stuttering. This is especially true in India, where there is limited number of studies regarding female CWS. Valid conclusions and inferences regarding the gender difference in stuttering in the Indian context hence cannot be made. This study attempts to explore in depth the nature of the problem in female CWS and compare them on every aspect explored, to the male CWS. This would help provide significant information as to why this is considered as a problem of males and also will give a better understanding into the problems that female CWS face, which are overlooked in various studies in India.

#### **Need for the study:**

There is a lot of debate about the onset, nature, development, type, associated problems, and cause of stuttering in male and female CWS. Valuable opinion is available in scattered texts but these available information need to be compiled and a comprehensive comparison is necessary to give a better picture of the difference in the nature of disfluencies between the male and female CWS. This in turn will help in understanding their problems in a better way, finding out the prognosis, help in early intervention and serve better in treating the male and female individuals with stuttering. The outlook towards the female CWS, their characteristics and needs can be understood better. Moreover, this will also give the clinician a better insight into how to deal with children with stuttering. In addition, most of the studies regarding gender and stuttering have been conducted in the western countries and such intensive studies have not been conducted in India. Further investigation into the cause of the condition will also be possible.

## **Aim of the study:**

- 1) To explore the difference in nature of disfluencies if any, in male and female CWS with regard to the age of onset, nature, development of the problem, type of disfluencies, time since onset of stuttering, etiology, associated problems, nature and duration of treatment.
- 2) To study the pattern of recovery/relapses and severity levels with regard to male and female CWS



## CHAPTER II

### REVIEW OF LITERATURE

Stuttering is a disorder of fluency onset of which in majority of individuals is in the preschool years. Despite decades of research it has evaded the researchers in understanding its onset, development, nature and management issues. Stuttering in children is a widely investigated area and an area of prime importance. Gender difference in stuttering has provoked the interests of many researchers but conflicts still exist regarding the differences in them. There have been differences documented in terms of the gender ratio, the age and nature of onset of stuttering, the type of disfluencies, the etiology, associated problems, recovery etc. An indepth investigation through the literature unfolds these differences.

#### **1) Gender ratio in CWS:**

A look into the gender ratio in stuttering thoroughly documents an unequal sex distribution. Stuttering has been indicated as a male predominate disorder time and again in the literature. The earliest investigation into the gender difference in stuttering was from the early 1890's. Investigations into this ratio are being carried out since then. Early reports indicated that stuttering takes place more often in boys than girls (Blanton, 1916; Milisen & Johnson, 1936; Palmer, 1938; Schuell, 1946). Further research into this ratio was carried out. An interesting study by Goldman

(1967) revealed that the sex ratio in a statewide survey of school children in Tennessee was 2.4:1 among the black children, compared to 4.9:1 among the white children. He reasoned that the black home environment was more 'matriarchal' thus imposing less pressure on the male as compared to the female. There was more of a 'patriarchal' environment for the white children: consequently, more was expected of the male child. Kidd, Heimbuch and Records (1981) reported a ratio of 6:1. Yairi and Ambrose (1992) in their study of 87 preschool CWS reported the male to female ratio as 2.1: 1. According to Felsenfeld (1996), there are three to four times as many boys who stutter as there are girls. Recent literature reports too indicate similar findings. Gupta (2001) report a sex difference as high as 6:1. More recently, Proctor, Yairi, Duff and Zhang (2008) reported that boys exhibited a higher prevalence of stuttering than girls in African American and European American CWS in the age range of 2-5 years.

However, there are also research findings indicating that there is a nearly even sex ratio among very young children who stutter and it is only gradually that the proportion of boys with stuttering increases. Yairi (1993) found a male to female ratio of 1:1. Bloodstein (1995) in his review indicated that the male to female ratio is about 3:1 in the first grade and 5:1 in the fifth grade, concluding that the sex ratio increases as children get older. Kloth, Kraaimaat, Janssen and Brutten (1999) found a male to female ratio of 1.1:1 near onset, which rose to 2.5:1 six years later. Research done in the current decade also observed the same. Mansson (2000) found a ratio of 1.65:1 at the initial screening (age 3 years) which rose to a ratio of 2.8:1 two years later. Van Borsel, Moeyart, Mostaert, Rossel, Loo and Renterghem (2006), in agreement with past studies support that stuttering prevalence is higher in males than females and the

tendency for stuttering prevalence to decrease with increasing age was confirmed too. There is therefore strong evidence that the sex ratio may increase as children get older with more males than females exhibiting stuttering, further indicating that many female CWS recover, while male children persist in stuttering.

Once the parent/caregiver suspects a child to be having stuttering, they are brought for assessment and effective management. Literature review provides interesting information on the professional first consulted by the parent. Bernstein, Ratner and Tetnowski (2006) report that parents are more likely to turn to pediatricians first if concerned about their child's speech. Similar findings have been reported by Guitar and Conture (2007), wherein the authors say that pediatricians, family physicians and other healthcare providers are often the first professionals to whom parents turn for advice about their child's disfluencies.

## **2) Type and nature of disfluencies:**

The type of disfluencies exhibited by CWS is an interesting area of investigation and has received considerable attention. The investigation of this difference across the gender is of greater appeal and can provide important information during assessment of male and female CWS separately.

Just as a child learns to walk by falling several times, children learn to talk fluently by stumbling and moving ahead of their disfluencies in speech. The period between 2 and 6 years of age is of great importance in studying disfluency patterns. This is because not only are children particularly disfluent during these ages (Muma,

1971), but also, the onset of stuttering is most frequently observed during this period of development (Van Riper, 1971). In most children (70-80%), the disfluencies spontaneously recover, or decrease in frequency. In some children, however, the disfluencies tend to persist. These disfluencies take the shape of repetition, prolongations, blocks/articulator fixations, hesitations, interjections, pauses, etc. Most stuttering begin with easy repetitions although some children exhibit prolongation and blocks as well. Rapid sounding repetitions may be predictive of persistent stuttering.

One crucial step in assessing the disfluencies in a child is finding out the type and the nature of disfluencies that a child has. When assessing the speech of preschool children, it is very important to count the total number of disfluencies. Disfluency counts have been classically used widely in clinical and basic research. According to Young (1961), frequency of stuttering is useful as a “snapshot” measure of progress during treatment. These counts are most commonly reported as percentage of syllables or percentage of words stuttered. Normally disfluent children usually have fewer than 10 disfluencies per 100 words.

Many different aspects of the nature of disfluencies and the association with the gender reveal substantial information. There is contradictory evidence with regard to difference in gender regarding the type of stuttering. Davis (1939), Oxtoby (1943) have shown that there is a higher frequency of part word syllable repetition in boys. However, no differences have been statistically significant. Johnson (1959) has indicated that as children, both males and females stutter about the same amount. He also found word repetitions to be very prominent in the speech of CWS. Yairi (1972) and Silverman (1974) found that sound and syllable repetitions were more common in

CWS. Yairi (1981) reported that males and females stutter in similar ways. In the same year, Yairi also reported a trend for boys to show more repetitions per instance of syllable repetition. Later, Ambrose and Yairi (1999) compared preschool children near the time of onset and a matched group of CWNS and did not find a gender difference for disfluency type emitted. In CWNS, there is a gradual decline in some types of disfluencies as children get older. The most important of this is the part word repetitions, which show a steady decline in by the age of 4 years and thereafter.

Clinically, the number of disfluencies, especially of certain types has been regarded as the most important index of stuttering severity. They include SLD (Stuttering like Disfluencies) and OD (Other Disfluencies) as stated by Young (1984) and Yairi and Ambrose (1992). Accordingly, sound repetitions, Single Syllable Word Repetitions, syllable repetition, prolongations and blocks are considered SLD. Multi syllabic word repetitions, Phrase repetitions, Interjections and Revisions are classified as Other Disfluencies (OD). This classification helps to determine whether a child can be classified as a CWS or not.

Yairi and colleagues (Yairi & Ambrose, 1996; Yairi, 1997) proposed that children who stutter can be distinguished from normally disfluent children using a grouping of stuttering like disfluencies (SLD). According to the author, children who stutter have more than 3 SLDs per 100 words, whereas normally disfluent children have fewer, i.e., less than half of the disfluencies of normally disfluent children are SLDs but about two- thirds of the disfluencies of children who stutter will be SLDs (Yairi, 1997a). This finding is also supported by many researchers (Conture, 2001, 2002; Yairi & Ambrose, 2005). Yairi and Ambrose (1996) reported a mean SLD of

10.52 per 100 syllables in preschool children who stutter, compared to mean SLD of 0.87 per 100 syllables for preschoolers who do not stutter. Ambrose and Yairi (1999) have reported data for 90 stuttering children, within 6 months of onset (between 2 and 5 years) and 54 age matched normally fluent children. They did not find significant differences for age or gender. SLD was found to differentiate the 2 groups, but other disfluencies did not. Exploring the relation between severity of stuttering and SLDs, Yairi and Ambrose (2005) found that children with more severe stuttering (based on the frequency of SLDs) produced shorter duration of three unit repetitions (because they repeat faster) than children with mild or moderate stuttering. Natke, Sandreiser, Van Ark, Pietrowsky, and Kalveram (2006) studied the disfluencies of children with stuttering within 5 years of age and found that SLDs were significantly more frequent in CWS than in CWNS. In a very recent study, exploring the difference between the gender in relation to type of stuttering, Anjana and Savithri (2007) analyzed the speech sample of 10 boys and 10 girls in the age range of 5.1-6 years and found that majority of the children had almost all the disfluency types. The most prominent disfluency type was sound repetitions. Also, significant gender differences were obtained, with boys showing significantly higher percentage of SLDs than the girls. This also shows that boys are at a greater risk for stuttering than girls.

The assessment of duration and secondary behaviors too is of extreme significance. They give important information about how much stuttering may be interfering with communication. Investigations into the loci of stuttering in linguistic units indicate that instances of stuttering exhibited by CWS tend to occur on (a) low frequency words (Soderberg, 1966; Palen & Peterson, 1982; Anderson, 2005), (b) first three words of an utterance (Howell & Au-Yeung, 1995; Bernstein, 1981; Wall,

Starkweather, & Cairns, 1981), (c) function words (Bernstein, 1981; Bloodstein & Grossman, 1981; Howell, Au-Yeung, & Sackin, 1999; Natke, Sandreiser, Van Ark, Pietrowsky, & Kalveram, 2004; Graham, Conture, & Camarata, 2005), and (d) longer or more syntactically complex utterances (Ratner & Sih, 1987; Kadi-Hanifi & Howell, 1992; Logan & Conture, 1995, 1997; Howell & Au-Yeung, 1995; Yaruss, 1999; Melnick & Conture, 2000). According to Bloodstein (1995), and many others stuttering in young children occurs most frequently not on nouns, verbs, adjectives and adverbs but on pronouns and conjunctions.

Most information regarding the onset, nature and development of stuttering is provided by parents/caregivers of the CWS. However, the information can be considered as reliable in most cases as demonstrated by Einarsdottir and Ingham (2009). The authors investigated the accuracy of parent identification of stuttering occurrence. Twenty parents of children who stutter made judgments of stuttering during repeated presentations of 3-min audio-visual samples of their children. Parents of children who stutter are both accurate and reliable in identifying brief intervals of speech containing stuttering and non-stuttering in their own children.

### **3) The onset of stuttering**

#### ***(i) Age of onset:***

Although stuttering begins within a wide age-range, detailed information about the age of onset of stuttering reveals substantial information. Current robust evidence indicates that, for a very large proportion of cases, it erupts during the preschool period. Most reports indicate stuttering to occur between the age range of 2-

6 years. Data obtained at the University of Illinois Stuttering Research Program revealed that for 65% of the child participants, stuttering onset occurred prior to age 3 (33 months); the figure rose to 85% by 3 1/2 years of age i.e., 42 months (Yairi & Ambrose, 2005).

The age of onset of stuttering is a very important parameter to be investigated. This is so because, age is a risk factor in regard to children's awareness of disfluent speech. Whereas some three-year olds are either clearly, or appear to be, aware of stuttering, available experimental data show a very large increase in awareness between ages 4 and 5, including normally fluent children (Ambrose & Yairi, 1994; Ezrati, Platzky, & Yairi, 2001). Another reason is that most of the predictive information on chronicity of stuttering is based on children identified within 6 months of onset. Reasons to explore this are that if treatment has begun soon after a child starts to stutter (within 18 months rather than several years) there is a better chance of preventing negative feelings. Evidence is accumulating that age at onset may bear a relation to genetic factors, in particular, it appears there may be a trend for persistent stuttering to have a slightly later onset than recovered stuttering (Yairi & Ambrose, 2005).

Comparing the age of onset across gender, numerous studies have concluded that females have an earlier age of onset of stuttering than males. But there has been contradictory evidence also. Andrews, Craig, Feyer, Hoddinott, Howie, & Neilson (1983) reported the age of onset to be same for both genders and did not consider that males have an earlier age of onset of stuttering than females. However, more recent data indicate that girls begin to stutter a little earlier. Yairi and Ambrose (1992), in



their study of 59 boys and 28 girls with stuttering in the age range of 1.6 years - 5.75 years, reported that the onset of stuttering in males is 40.56 months and in females it is 34.21 months with a 5 month difference in mean age at onset between males and females. Yairi (1993) reported onset for girls to be 6 months earlier than boys. Comparing the obtained data of their study, Yairi, Ambrose, Paden, & Throneburg (1996) found that onset was later for those children whose stuttering persisted than for those whose stuttering remitted. Yaruss, LaSalle and Conture (1998), found an age of onset of 30 months for girls and 36 months for boys. More recently, Mansson (2000) in a study of incidence and development of stuttering reported that boys tended to have later onsets than girls (34 months for boys and 31 months for girls).

Co-relating the age of onset with speech/language development, Boey (2009) found that children with a precocious tempo of speech/language development have a younger age at onset; overall 2.3 months earlier, and have been seen closer to onset of stuttering whereas children with a delayed tempo of speech/language development have been classified more frequently with a gradual onset than the children with a normal or precocious speech/language development.

The onset of stuttering therefore is considered to be earlier in female than male CWS.

***(ii) Nature of onset and development of stuttering:***

Stuttering may start as a gradual increase in the frequency of repetitions and prolongations that are common in children learning to talk. It may also begin suddenly with disfluencies that are striking in terms of their frequency and duration and the

amount of physical tension that the child shows when stuttering. Abrupt onset of stuttering has been described by approximately one third of the parents in several studies (Yairi, 1983; Yairi & Ambrose, 1992).

However, it is often difficult to investigate the type of onset of stuttering as sudden or gradual, as this is so dependent on parent's memories and on a common understanding of the meaning of sudden and gradual. Historically, development of stuttering problems were typically reported to be a gradual process with easier more variable forms of stuttering followed by increasing fragmentation and tension. More recent reports (Yairi, Ambrose & Nierman, 1993; Yairi et al, 1996) however, suggest that a significant number of preschool children exhibit a sudden onset of moderate to severe stuttering. Buck, Lees and Cook (2002) found that 53 percent of their cases had onsets reported as sudden. Yairi, and Ambrose, (2003) reported that 41% of the preschool age children had sudden onset (1-3 days), 32% intermediate onset (1-2 weeks) and the remaining 27% of the children were reported to have a gradual onset of stuttering. Sudden onset was also observed in 30 percent of cases, as reported by Yairi and Ambrose (2005).

Between the gender, few investigations into the nature of onset has been carried out. Yairi and Ambrose (1992) reported that, out of 87 children (59 boys and 28 girls), 44% (26 boys and 12 girls) had a sudden onset and 56% (33 boys and 16 girls) had a gradual onset. Also, out of the 87 participants, 60 children were reported as having mild stuttering, 14 children were reported as having moderate stuttering and 10 children (6 males and 4 females) were rated as having severe stuttering at onset. Another significant finding was that all the 6 males and 2 out of the 4 females had a

sudden onset of stuttering. This study dictates a positive relationship between severe stuttering and sudden onset. The authors also found a positive relationship between gradual onset of stuttering and a positive family history of stuttering. Mansson (2000) in his study of 3 year old children (8 boys and 4 girls) with stuttering classified onset of stuttering longer than a period of 1 week as gradual and within a week as sudden. He found that 8 of the children (67%) had a gradual onset and 4 (33%) had a sudden onset. In sudden onset, this was frequently associated with stress and in many cases the early stuttering was moderate to severe. More recently, Yairi and Ambrose (2005) reported that patterns of onset age are similar for males and females.

Linking the nature of onset and the degree of severity, interesting observations have been made. Boey (2009) reported that often a sudden onset of stuttering is seen in children with more severe stuttering. The author also reports that a sudden onset of stuttering is more often associated with high temperamental children compared with low temperamental peers (53% versus 38.5%) than gradual onset (47% versus 62%).

The course of development of stuttering is determined in part by the biological responses of the child to fear and frustration and to autonomic conditioning to which a child prone to chronic stuttering may be highly sensitive.

#### **4) Severity of stuttering:**

Stuttering is highly variable and it differs in frequency and severity fluctuating from one situation to another, one day to another. This is more apparent with young CWS. Van Riper (1982) reported that most children, especially in their early years,

oscillate between remissions and recurrences of their stuttering, between mild stuttering and normal disfluencies, or between more advanced and less advanced stages of development. Parents of CWS often report that, at first, the disfluency pattern is highly episodic, periods of days, weeks or even months pass between episodes of disfluency. Gradually, the interval shrinks and becomes more chronic and consistent.

The categorization into severity levels of stuttering lay the foundation stone for detailed exploration into a child's condition, the extent of the stuttering and the type of behaviors associated with it. It paves a path on which further analysis of the child's disfluency patterns can be carried out. Stuttering can be broadly classified into 3 severity levels of mild, moderate and severe stuttering.

Guitar & Conture (2007) provide a comprehensive description of the disfluencies exhibited at each severity level of stuttering. Mild stuttering in children may begin most frequently between the ages of 18 months and 7 years, but most frequently begins within 3 and 5 years, when language development is particularly rapid. Children who stutter mildly may show the same sound, syllable and word repetition as children with normal disfluencies but may have a higher frequency of repetitions overall as well as more repetitions each time. They may also occasionally prolong sounds. In addition, they may show signs of reacting to their disfluency. Unlike normal disfluencies, mild stuttering tends to appear more regularly. The child may not be deeply concerned about the problem but may be temporarily embarrassed or frustrated by it. Parent's responses to mild stuttering may vary. Most will be at least, mildly concerned about it and wonder what they should do. Children diagnosed

with moderate stuttering stutter on about 8-12% of words, tension occasionally distracting and disfluencies average about one second in duration. Disfluency patterns may be characterized by an occasional complicating sound or grimaces or an occasional distracting associated movement. Children with severe stuttering usually show signs of physical struggle, increased physical tension, and attempt to hide their stuttering and avoid speaking. Severe stuttering is more common in older children. In some cases, it appears that children have been stuttering mildly for months or years. In other cases, severe stuttering may appear suddenly, without a period of mild stuttering preceding it. Severe stuttering is characterized by speech disfluencies in practically every phrase or sentence. Often moments of stuttering are one second or longer in duration. Prolongation of sounds and silent blockages of speech are common. Severe stuttering is more likely to persist especially in children who have been stuttering for 18 months or longer, although even some of these children will recover spontaneously.

According to Boey (2009), children with a more severe stuttering have obtained a longer time since onset. This suggests that a part of the older children obtained a higher stuttering severity post onset as a result of the development of their stuttering.

The most common measure of the severity is SSI and it is the best measure of severity available (Guitar 2006). It is one of the few measures of stuttering that has standardized procedures for gathering speech samples and is also the only measure that includes three important dimensions for appropriate description of the disorder- frequency, duration and physical concomitants. Using the SSI-3, the total overall

score can be used to derive a percentile ranking that range from very mild to very severe. It is possible however, that normally disfluent children or normal children without any disfluency may be rated as stuttering at the very mild level on the SSI-3. Thus, clinical judgments made by the analysis of the type and frequency of disfluency must be used to sort out children who are actually stuttering and who are not. The SSI-3 is not a tool for differentiating stuttering from normal disfluency but for assessing a child's severity (Guitar, 2006).

## **5) Etiology:**

The etiology of stuttering is perhaps the most widely explored area in stuttering. This area has been under investigation from ancient Greek times. A very important aspect of this investigation has focused on exploring the difference in etiology across the gender.

### ***a) Gender difference as a causative factor:***

Various causes have been proposed to account for stuttering in boys and girls and more stuttering in boys. The question of why there is a sex ratio in stuttering has been subject to almost as varied speculation as the cause of stuttering itself. In the past, the difference in incidence between males and females was explained in a number of different ways including cultural differences in child rearing practices, (Johnson 1955), different societal stress levels on boys and girls. Schuell (1946, 1947) gathered evidence appearing to show that boys tend to compare unfavorably with girls in physical, social and language development, and that they are less sheltered than

girls, and encounter more unequal competition, insecurity and frustration, especially in relation to language situations. She speculated that these factors tended to result in speech that was more hesitant and therefore more frequently lent itself to a diagnosis of stuttering by parents. Bloodstein and Smith (1954) seem to indicate that while boys may be less fluent than girls, parents seem to set higher demands for fluency on the boys and are thus more inclined to label their sons as having stuttering than their daughters. Goldman (1967) sought to provide evidence in support of the hypothesis that the sex ratio is related to greater environmental pressure on males. According to Ainsworth & Fraser-Gruss (1981), the difference is because of how parents and others tend to perceive, evaluate and react to boys. A boy is expected to act like a man too soon. One important observation that challenged the reported gender ratio was by Silverman and Van Opens (1980). The authors surveyed 133 kindergarten through sixth grade suburban elementary classroom teachers to determine whether they showed a general bias in their speech and language referrals. The results surprisingly revealed that the teachers were more likely to refer a male CWS rather than a female CWS.

***b) Biological and neurological factors:***

Later theories tried to explain the disparity in sex ratio in stuttering based on biological and genetic differences between the sexes (Kidd, Kidd & Records, 1978; Geschwind & Galaburda, 1985; MacFarlane, Hanson, Walton & Mellon, 1991). The support for the more recent biological and genetic cause comes from a number of different disorders for which a neurological basis has been well established. These include dyslexia (Lewis, Hitch & Walker, 1994), Down syndrome, congenital

deafness (Cremers, Van Rijin, & Huygen, 1994), Tourette syndrome (Williams, Pleak & Hanesian, 1987; Popper 1988). The preponderance of males in each of these disorders strongly suggests that boys are more susceptible biologically to a number of developmental disorders, including stuttering. The sex ratio in stuttering may be viewed as directly or indirectly reflecting the broad congenital vulnerability of the male constitution. Geschwind and Galaburda (1985) considered that sex ratio in stuttering is due to higher levels of testosterone in the male fetus than in the female. Testosterone retards the development of the left cerebral hemisphere, thus increasing the risk of speech and language disturbances including stuttering. Congenital brain damage is also suspected to be a predisposing factor in some cases (Andrews et al, 1983). Guitar (2006) reported that stuttering emerges from disruptions caused by a child's inefficient neural networks for speech and language processing.

*c) Linguistic factors:*

Between the ages of 1 and 6 years, there is an intensive period of growth and this period is a two edged sword for children predisposed to stuttering. Neurological maturation may provide more functional cerebral space that supports fluency but it also spurs development of other motor behaviors that may compete with fluency for available neural resources (Guitar, 2006). During early childhood, there are innate differences between boy's and girl's speech and language abilities.

Motoric aspects of stuttering (speech motor control of articulation, phonation and respiration) have received considerable attention over the past 20 years. Recent research indicates that linguistic variables such as phonology, semantics and syntax



may also contribute to childhood stuttering. There is evidence that onset of stuttering generally occurs at ages when language growth is largest (Bloodstein, 1995). The timing of onset of stuttering, that is early childhood after a period of apparently normal speech development is explained as due to the fact that at this stage of development an explosive growth in language ability outstrips a still immature motor speech apparatus (Andrews et al, 1983). It has been proved through research that girls between 1 and 5 years of age are more proficient in language skills than their male counterparts (McGuiness, 1976; Smolak, 1986). There is also some evidence that girls may talk 1 month earlier than boys (Moore, 1967; Shucard, Schucard & Thomas, 1987; Gazzaniga et al, 1998). Substantial evidence indicates that females are less strongly lateralized than are males (Geschwind & Galaburda, 1985). The later age of stuttering onset for boys may reflect a slower language/phonological development (Yairi & Ambrose, 1992). Yairi (1993) explained the disparity in the sex ratio by saying that girls seem to develop stuttering at an earlier age than boys, and this may be because they are earlier in speech development and are therefore reaching the vulnerable stage of putting words together at an earlier age. In general girls develop and mature earlier than boys.

#### ***d) Genetics:***

Attempts to understand the relation between genetics and stuttering have been very crucial in revealing the difference in the occurrence of stuttering in male and female CWS. Geneticists have found indications that a susceptibility to stuttering may be inherited and that it is most likely to occur in boys. The first modern reports on the

genetics of stuttering were published by Andrews and Harris (1964) and Kay (1964).

They investigated the family history of 80 CWS and found that:

- 1) Children who stuttered had far more stuttering relatives than children who did not.
- 2) Male children were at a higher risk for developing stuttering than female children.
- 3) Female children who stuttered were more likely to have stuttering relatives than male children who stuttered.

However, this study focused on children and adults most of whom had been stuttering for several years. The study by Andrews and Harris (1964) also found that female probands have a higher frequency of affected relatives of both sexes than do the male probands. Unlike past studies, Ambrose, Yairi and Cox (1993) found that male and female children who stutter had similar chances of having relatives who stuttered. However, recently, Gupta (2001) reported that females had higher percentage of affected relatives than males.

Studies have also been carried out to explore if more males than females had stuttering in family of CWS. Wingate (1964), Kidd et al (1981) and MacFarlane et al (1991) found greater number of males than females in the families of PWS. According to Kidd, Kidd and Records (1978) and Kidd (1983, 1984), stuttering genotypes are expressed as different susceptibilities based on sex. As the 'stuttering threshold' is hypothesized to be higher for females, it is assumed that more precipitating (genetic or environmental) factors that contribute to stuttering would have to be present for females to cross the threshold and manifest the disorder. Ambrose, Yairi and Cox (1993), studied the family history of 69 very young children

who had just been diagnosed with stuttering. They found that two thirds of these children had relatives who stuttered and more male relatives than female relatives stuttered. In families with positive family history for stuttering, males are genetically more susceptible to stuttering than females. Females are more resistant to an inherent susceptibility to stuttering than males. Anjana (2004) found that the first degree relatives have a higher percent of stuttering compared to second degree relatives. Among the first degree relatives, brothers, grandfathers and cousin brothers had a higher percent of stuttering compared to others. Among the second degree relatives, paternal uncles, maternal uncles had a high percent of stuttering. This shows that there are more males than females affected among both first and second degree relatives. The transmission of the characteristics of stuttering increases when the father of the proband also stutters.

*e) Environmental:*

Heredity cannot be assumed as the sole cause of stuttering. This is because 40 to 70% of PWS have no family history of stuttering (Yairi et al 1996). Studies by many authors (Kidd, Kidd & Records 1978; Howie, 1981; Andrews et al 1991; Yairi et al, 1996) indicate that both genetic and environmental influences contribute to stuttering onsets. Environmental factors are of great interest because of their potential impact on causing stuttering and inhibiting its remission. Some researchers have claimed that the extra pressure (for example, increased time pressure on verbal responses, being told to respond using advanced language, generally high level of expectation) can lead to increased risk of stuttering (Stewart, 1960; Rustin, Botteril & Kelman, 1996). Other factors include infectious diseases, intense fear, injury,

competing with siblings, speaking time in a busy home, etc. In addition to a genetic component, stuttering can be imitative and it is possible in some cases that a child who stutters may be picking up a disfluent model. Starkweather (1987) wrote that “all children speak with more disfluency during periods of tension-when moving or changing school, when their parents divorce, or after the death of a family member.” These increases in disfluency could easily result in the onset of stuttering or in increased stuttering in children who are vulnerable to such stresses. Events that may precipitate the onset of stuttering include the birth of a sibling, moving to a new home, family travel, prolonged periods of anxiety or excitement, and growth spurts in a child’s language or cognition (Guitar 2006).

Currently, there is general agreement that stuttering can be inherited. But research has shown that for a number of inherited disorders, genes do not work alone. In some cases, there are genetic transmissions and in some it is not present. According to Guitar (2006), this happens because genetic transmission may be through two factors- anomalous neural organization for speech and sensitive temperament. In some cases of childhood stuttering, genetic transmission may be in suspect because no other family member seems to be affected. However, this may occur because persistent stuttering appears to require both predisposing factors. Another way to reason this out may be that both the predisposing factors were the result not of genetic inheritance, but of environmental factors affecting fetal development that created the neural substance for stuttering.

The unfolding of the genetic blueprint is extensively influenced by environmental factors and by chance. Thus, the anomalous circuitry in one child may

result in stuttering, but in an uncle/grandmother, it may have resulted in an articulation disorder or a learning problem. It can be seen as the result of heredity and environment acting together, with elements of chance thrown in (Kidd 1984).

Therefore, it can be concluded that for each child there will be an individual combination of factors that contribute to his or her vulnerability to stuttering (Starkweather & Gottwald, 1990; Wall & Myers, 1995; Rustin et al., 1996). The onset of the disorder may be influenced by neurological functioning (Sommer, Koch, Paulus, Weiller, & Buchel, 2002), motor skills development (Kelly, Smith, & Goffman, 1995), and/or linguistic processing abilities. (Miles & Ratner, 2001). The knowledge that stuttering runs in families appear to suggest that some of these variables may be genetically transmitted. Starkweather (2002) argued that genes only increase the likelihood that a behavior will occur and that it is the environment or context that influences the “extent to which a behavioral trait finds expression”. With the passage of time, additional variables, such as parent interaction behaviors (Kloth et al., 1999), the child’s articulatory skills (Kloth et al., 1999), and/or the child’s temperament (Conture, 2001; Guitar, 2006), may become significant in relation to the moment of stuttering , chronicity of the disorder and the effect on the child.

## **6) Recovery:**

Remission of stuttering can occur at any age but at least one half of these remissions occur within the first two years of the onset of stuttering. Yairi (1997) reported that in childhood, remission rates of stuttering are high, especially during the 12 to 18 months after onset. Mansson (2000) followed up parents to rate stuttering

severity 2 years after onset for 12 children with stuttering. Initially, out of the 12 children, 5 were rated as having severe stuttering, 4 moderate stuttering and 3 as mild stuttering. On follow up, there was a marked decline in fluency for these children. Only 1 child was rated as exhibiting severe stuttering, 3 children were rated as moderate, and 8 as having mild stuttering. A recent study by Yairi and Ambrose (2004) reported that once a child has been stuttering for more than 2 years, the remaining chance of recovery is 47% by 3 years post onset; it is 16% and by 4 years following onset and only 5% are still likely to recover naturally. According to Guitar and Conture (2007), children who begin stuttering before age 3.5 years are more likely to outgrow stuttering. If the child begins stuttering before age 3, there is a much better chance he will outgrow it within 6 months. If the child has been stuttering longer than 6 months, he may be less likely to outgrow it on his own. If he has been stuttering longer than 12 months, there is an even smaller likelihood that he will outgrow it on his own. Thus, these findings indicate that as the number of years with stuttering increases, chances of recovery reduces.

Gender is one of the factors in predicting possible recovery. Spontaneous recovery is common in both males and females but the gender ratio in adults is around 4:1, indicating that more females than males spontaneously recover. Early remissions occur more often among young girls than boys and for mild rather than severe stuttering among later remissions. For boys, right from onset, about 25% will recover by 2 years following the onset of their disorder, about 50% will still recover and about 25% will continue to stutter, but for girls, 45% will recover by this time an additional 40% will still recover and about 15% will continue (Yairi & Ambrose, 2004). Males

gradually come to outnumber females as time goes by; meaning girls are more likely to spontaneously recover (Felsenfeld, 1997; Yairi & Ambrose, 1990).

Research presents opposing evidence regarding the gender factor in recovery. According to Yairi and Ambrose (1996) severity and early presence of secondary physical characteristics do not appear to provide predictive information. However, several reports (Seider, Gladstein & Kidd, 1983; Ambrose, Cox & Yairi, 1997; Yairi, (1997) have indicated that gender is an important factor in that females have a better chance of recovery.

The earlier recovery in females has been accounted to genetics by several authors. Kidd (1984) and Yairi (1993) have suggested that this tendency might reflect a genetically controlled and milder form of stuttering in girls. Ambrose, Cox and Yairi (1997) analyzed the family trees of 66 children who were identified soon after the onset of stuttering. The children were followed for several years and eventually grouped into those who persisted in stuttering and those who recovered from stuttering. Researchers found that the sex ratios of the two groups were quite different. The male: female ratio was 7:1 in the persistent group, and 2:1 in the recovered group, indicating a much higher percentage of boys in the persistent group. The authors confirmed the importance for recovery of being a girl and coming from a family in which any relatives who did stutter had recovered. This provides more evidence that girls are more likely to recover than boys. According to Ingham et al (2004), the gender differences may be related to differences between the genders with respect to susceptibility (males predominate) and recovery from chronic stuttering (females show higher recovery rates during childhood). Much of what is known today

of recovery is summarized in Yairi and Ambrose data (2005). Their data reflect analysis of behavior seen in 70 recovered and 19 persistent children identified shortly after stuttering onset (under age 6). While 84% of the young girls recovered only 77% of the boys recovered. Additionally, girls tended to recover almost six months earlier (post onset age) than did boys.

In addition, the occurrence of associated problems together with stuttering further delays the recovery. Guitar and Conture (2007) indicated that a child who speaks clearly with few, if any speech errors would be more likely to outgrow stuttering than a child whose speech errors make him difficult to understand.

## **7) Associated problems:**

Estimating the occurrence of other problems along with stuttering in CWS is crucial. From a clinical perspective, determining the frequency of concomitant disorders in children who stutter is important because there might be a subgroup of children who require a different type of assessment and treatment procedure than those who only stutter (Wolk, Edwards & Conture, 1993). Moreover, this will also help understand their problem and assess the contributing factors to the condition. Few studies have examined the gender factor when reporting on co-occurring disorders. Males were reported to have a significantly greater percentage of co-occurring speech disorders than females. It may be that co-occurring or competing speech processing tasks stress the physiological system to a greater extent in males than females (Blood, Ridenour, Qualls & Hammer, 2003).



A consistent finding in the literature on stuttering is that a small but significant percentage of children who stutter exhibit concomitant speech/language disorders in addition to their stuttering. Arndt and Healey (2001) collected data from 10 States across the nation and found that half of 467 children who stutter presented with some form of a concomitant disorder, such as phonological disorder (32%), language disorder (35%), both phonological and language disorder (33%).

*a. Phonological problems:*

In the profession of speech-language pathology, it is widely believed that children who stutter are far more likely to have a phonological disorder than their non-stuttering peers (St. Louis & Hinzman, 1988; Bloodstein, 1995; Louko, 1995). For example, it is often stated that 30-40% of children who stutter have a phonological disorder, in contrast to the 2-6% of children in the general population (Bernstein Ratner, 1995; Louko, 1995; Melnick & Conture, 2000). Of all the speech language problems that co-occur with stuttering, phonological difficulties are reported to be the most common (Bloodstein, 1987). Nippold (2001) investigated the frequency of co-occurrence of phonological disorders and stuttering in children by examining recently published studies on the same. The author concluded that frequency rates vary widely from one study to another, making it difficult to state with confidence just how often the two disorders co-occur. In any case, even when children who stutter are reported to experience phonological disorders, those problems tend to be mild, deleting a small number of phonemes (St. Louis, Murray & Ashworth, 1991) and later developing phonological patterns such as consonant clusters (Louko, Edwards, & Conture, 1990).

Kolk and Postma (1997) suggest that CWS are more prone to phonological encoding errors because they are continuously slower at this task. At young ages, male children are more prone to develop phonological deficits than female children. Paden, Yairi and Ambrose (1999) found that children who recovered from stuttering scored higher on the assessment of phonological processes-revised (Hodson 1986) than the children who did not recover. Thus, it appears that a child's phonological status may predict recovery. Children with delayed phonology are at a risk for stuttering to persist. There are reports that the phonological delay associated with stuttering will likely be overcome within 1-2 years post-onset (Paden, Ambrose, & Yairi, 2002).

***b. Learning problems:***

There is considerable body of evidence that school going CWS have learning disabilities more often than do peers who do not stutter (Blood & Seider, 1981; Bloodstein, 1987; St. Louis & Hinzman, 1988). Blood, Ridenour, Qualls and Hammer (2003) found that children with learning disability made up 15% of their large sample of children who stuttered.

***c. Articulation problems:***

Ryan (1992) examined the potential performance difference between 20 CWS and CWNS male and female preschool children. There were no differences between the CWS and CWNS groups on articulation proficiency, although 25% of the CWS group (all boys) later required articulation treatment. The CWS scored lower on seven

out of eight language measures than the CWNS and slightly lower than the average score for their age group when compared with the tests' normative samples.

*d. Language problems:*

The literature does not provide a clear picture regarding the language skills of children who stutter. In incipient stage, stuttering is located at the beginning of syntactic units, (sentence or phrases) and this finding led to the belief that the task of linguistic planning and preparation is a key ingredient in the recipe for disfluency. Andrews et al (1983) confirmed that children who stutter perform poorly on some standardized tests. CWS typically achieve lower scores than their peers on measures of receptive vocabulary, the age of speech and language onset, MLU and receptive and expressive syntax (Andrews & Harris, 1964). Ryan (1992) reported that girls demonstrated higher language scores than boys. According to Yairi and Ambrose (1992), the later age of stuttering onset for boys may reflect a slower language/phonological development.

Some literature reviews and empirical studies have suggested that CWS may have less developed phonology, vocabulary, or overall language abilities than their normally-fluent peers (Anderson & Conture, 2000, 2004; Byrd & Cooper, 1989; Pellowski, Conture, Anderson, & Ohde, 2001). Evidence against this include the research conducted by Nippold (1990) who, failed to find sufficient support for the contention that children who stutter are more likely to have language delays. Although the literature is unclear on whether the language skills of children who stutter are equivalent to their fluent peers (Andrews et al., 1983; Yairi, Watkins,

Ambrose, & Paden, 2001), most experts agree that children who stutter, as a group, do not exhibit gross language disorders (Yairi, Watkins, Ambrose, & Paden, 2001; Bennett, 2006). Howell, Davis, and Au-Yeung (2003) reported that CWS and CWNS (aged 2–10 years) performed similarly on the Reception of Syntax Test, a measure of syntactic development. To further challenge any clear-cut interpretation of this area of empirical investigation, some studies have reported that CWS may have above average expressive language abilities relative to their developmental expectations (Watkins & Yairi, 1997; Watkins, Yairi, & Ambrose, 1999, Guitar & Conture, 2007).

Several studies of children with language impairment have found that they, or a subgroup of them evidence high frequencies of the types of disfluencies that are seen more often in children who stutter than in normal children, even though they wouldn't be considered CWS (Boscolo, Ratner & Rescorla, 2002; Hall, Yamashita, & Aram, 1993; Horge, Rescorla & Ratner, 1999). These authors speculate that the excess disfluencies result from difficulties in formulating and expressing utterances just beyond the limits of their language abilities. Thus, when language resources are strained, fluency must be sacrificed in order to meet the demands of language production.

*e. Behavioral problems:*

The occurrence of behavioral problems has also been reported with stuttering. Healey and Reid (2003) noted that an increasingly large number of children who stutter are being diagnosed with attention deficit hyperactivity disorder (ADHD). Also, boys are classified four times more emotionally disturbed than girls (Stout &

Conoley, 1992). A number of authors have speculated about the possible importance of considering temperament in gaining a better understanding of the nature of stuttering (Bloodstein, 1987, 1995; Conture, 1991; Peters & Guitar, 1991; Guitar, 1997, 1998, 2000). Indirect support for this possibility may be the findings of Kagan, Reznick, and Snidman (1987) that more sensitive children manifest their reactivity by generating higher levels of physical tension, particularly in laryngeal muscles when they are speaking in unfamiliar or threatening situations.

Anderson, Pellowski, Conture and Kelly (2003) report that CWS exhibited temperamental tendencies of being less distractible (excessively vigilant), less able to adapt to change and more irregular in their sleep, eating and bathroom habits. In addition, parents of children who stutter rate their children as more sensitive compared with parents of non-stuttering children on the behavior style questionnaire.

This detailed exploration through the available literature on gender difference in stuttering therefore reveals that although many aspects of stuttering have been investigated in the western literature, there are various contradictions too which make drawing of important conclusions difficult. Indian literature is lacking in explaining the gender differences. More studies with balanced number of subjects and detailed investigations of the responses of each of the subjects are crucial to understand the gender difference in stuttering better.

## CHAPTER III

### METHOD

Researchers have attempted to investigate several different aspects of stuttering in children and to obtain a relation among them. Attention has been focused on determining the differences across gender if any in these aspects. These guidelines are important in understanding the gender difference in CWS, giving a better insight into the nature of their difficulties separately, which may help in further management. The aim of the study therefore was to explore gender differences if any, in the nature of disfluencies in CWS.

The objectives of the study were-

- 1) To investigate the difference in nature of disfluencies if any, in male and female CWS with regard to the age of onset, nature, development of the problem, type of disfluencies, time since onset of stuttering, etiology, associated problems, and nature and duration of treatment taken.
- 2) To study the pattern of recovery/relapses and severity levels in male and female CWS

#### **Participants:**

Participants for the study included Kannada and Telugu speaking, male and female CWS in the age range of 3-6 years, registered at the All India Institute of

Speech and Hearing, Mysore. 30 males and 24 females CWS were considered as participants in the present study.

**Inclusion criteria:**

- Children diagnosed as having stuttering by a qualified speech language pathologist
- Children with no other associated cognitive problems
- Children in the age range of 3-6 years

**Test Material:**

**The following materials were used for assessment:**

- Stuttering severity instrument (SSI-3): The SSI was developed by Riley (1994) for children and adults with stuttering. It is the only test that considers three important parameters for appropriate description of stuttering- frequency, duration and physical concomitants. The total score obtained can then be put accordingly under the severity levels of very mild, mild, moderate, severe and very severe stuttering.
- Language Assessment Checklist for children (Swapna, Jayaram, Prema & Geetha, 2010): It tests for the comprehension and expressive abilities of the child between the ages of 0 to 6 years. The items of the test are listed under 12 age levels of 6 months interval each between 0 to 6 years.
- Pictures for description from the fluency test (Nagapoornima, 1990): It comprises of pictures and stories and is specifically designed for children from 3-7 years of age.

- Questionnaire: A questionnaire was developed for the study, specifically targeted to obtain information regarding the onset, nature, development of stuttering, the present severity, associated problems, suspected cause, treatment, recovery and relapse.
- Set of questions for conversation sample
- Topic for monologue
- A sample for writing (spontaneous and copied)
- Words and numbers for dictation
- Video recording (using Compaq laptop, Digital video camera recorder- Sony, model no: HDR-TG 1E).
- SPSS 16 software for data entry and analysis.

## **Procedure**

The data was collected in two phases:

**Phase 1:** In Phase I case histories of all children registered at the All India Institute of Speech and Hearing (AIISH) during the period of 2.7 years (September 2007- April 2010) with the complaint of stuttering were reviewed. A total of 84 case files of children diagnosed by a speech language pathologist as children with stuttering, and who are within 3-6 years of age were selected. Of these, 51 were case files of male CWS, out of which 19 were with mild stuttering, 18 moderate and 14 with severe stuttering. The remaining 33 case files of female CWS were classified in a similar manner, with 14 under mild, 13 under moderate and 6 under severe stuttering.



**Phase 2:** In Phase 2, the selected CWS with complete address and/or telephone numbers were followed up through telephone/correspondence. A total of 80 CWS were followed up of which 51 children (27 male CWS and 24 female CWS) reported for assessment. Further, 24 male and 24 female CWS who reported for the follow up were considered for the study. 3 male CWS were not considered for the study due to lack of adequate samples. Follow up included 10 CWS in mild severity level, 10 in moderate and 4 in severe stuttering for both male and female CWS. In male CWS, available case file details of the remaining 6 children are also presented.

The period of follow up ranged from 10 days to 2.7 years. On follow up, the questionnaire was administered to the parents/caregiver through an interview. A minimum of 150-200 word speech samples was video recorded during 30-45 minutes of interaction between the child, the parent and the investigator. Care was taken to ensure that the sample was no less than 5-minutes duration of the child's talking.

### **Data Analysis:**

The recorded samples were transcribed verbatim. Speech samples were analyzed from a variety of speaking contexts, including dialogue, monologue etc. The samples obtained from each participant were analyzed for the frequency of total disfluencies per 100 words. Within this, the mean frequency of Stuttering Like Disfluencies (SLDs) (i.e, sound repetitions, single syllable word repetitions, syllable repetition, prolongations and blocks) and Other Disfluencies (ODs) (multisyllabic word repetitions, phrase repetitions, interjections and revisions) per 100 words were

calculated. SSI-3 was administered to arrive at an overall score and severity of stuttering.

The following percentages were computed:

- a) Percentage of total disfluencies/total words
- b) Percentage of SLDs/total disfluencies
- c) Percentage of ODs/total disfluencies

After data analysis, a child was classified as CWS if he/she:

- a) Exhibited three or more stuttering like disfluencies per 100 words of conversational speech, as per Pellowski & Conture (2002)
- b) Received a total score of 11 or above (at least 'mild' in severity) on the Stuttering Severity Instrument-3, as per Coulter, Anderson & Conture (2009)

After data analysis, a child was classified as CWNS if he/she:

- a) Exhibited two or fewer stuttering like disfluencies per 100 words of conversational speech, as per Pellowski & Conture (2002)
- b) Received a total score of 10 or below (severity rating of less than 'very mild') on the stuttering severity instrument-3, as per Coulter, Anderson & Conture (2009)

The data was tabulated and statistically analyzed using SPSS package to answer the research objectives.

## CHAPTER 1V

### RESULTS AND DISCUSSION

The purpose of the present study was to explore the gender difference, if any, in male and female CWS with respect to parameters such as age of onset, nature and development of stuttering, type of stuttering, causative factors, associated problems, time since onset (TSO) and nature and duration of treatment taken. It was also aimed to compare the recovery across male and female CWS (as a group and within each severity level) using SSI-3 severity ratings. Attempts were made to look into the percentage of SLDs vs. ODs. Samples of monologue, dialogue, reading and writing were obtained. Questionnaire, SSI-3, Language Assessment Checklist, Articulation Test were administered for 24 male and 24 female CWS in the age range of 3-6 years. The obtained data was statistically treated

The results are discussed under the following 8 headings across gender and severity:

- 1) Age of onset
- 2) Nature and development of stuttering
- 3) TSO (Time since onset) and first consultation
- 4) Associated problems
- 5) Nature and duration of treatment
- 6) Causative factors
- 7) Type of stuttering

8) Recovery :

- a) Across gender and severity according to SSI-3
- b) Across gender and severity according to SLD vs. OD.

**1) Age of onset across gender and severity:**

The data collected were grouped into 3 age groups, < 2; 2 - 4 and 4 - 6 years for the analysis of age of onset information. The results are shown in Table 1.

Gender	Severity	Age of onset			
		< 2 years	2-4 years	4-6 years	Total
Male	Mild stuttering	0 (0%)	7 (70%)	3 (30%)	10 (100%)
	Moderate stuttering	2 (20%)	6 (60%)	2 (20%)	10 (100%)
	Severe stuttering	0 (0%)	5 (50%)	5 (50%)	10 (100%)
	Total	2 (6.6%)	18 (60%)	10 (33.3%)	30 (100%)
Female	Mild stuttering	2 (20%)	6 (60%)	2 (20%)	10 (100%)
	Moderate stuttering	1 (10%)	5 (50%)	4 (40%)	10 (100%)
	Severe stuttering	0 (0%)	1 (25%)	3 (75%)	4 (100%)
	Total	2 (8.3%)	13 (54.16%)	9 (37.5%)	24 (100%)

Table 1: Age of onset across gender and severity

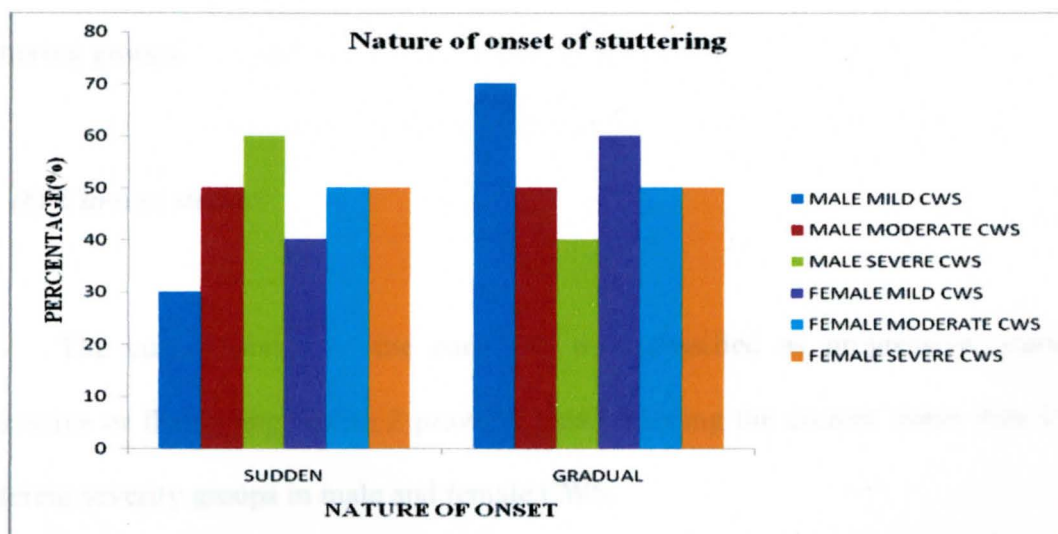
The age of onset of stuttering has been reported to be within 2-6 years of age. The present study also obtained similar results. In majority of the male (60%) and female (54%) CWS the onset of stuttering has reported to be between 2- 4 years. Most of the studies on onset of stuttering across gender suggest that female CWS have an earlier age of onset than male CWS (Yairi & Ambrose, 1992; Yairi, 1993; Yaruss, LaSalle & Conture, 1998; Mansson, 2000). However, opposing results have been reported by Andrews, Craig, Feyer, Hoddinott, Howie, & Neilson (1983) wherein, the authors reported the age of onset to be same for both genders. Data obtained from the present study supports their study results. 8.3% of female CWS had onset before 2 years compared to 6.6% of male CWS. Almost equal numbers of male and female

CWS had onsets of stuttering between <2, 2-4 and 4-6 years. However, smaller intervals of age could have given a better insight.

## 2) Nature and development of stuttering across gender and severity:

### (a) Nature of onset:

The nature of onset was categorized into two types- sudden and gradual onset. Graph 1 shows the nature of onset across the gender and different severity groups.



Graph 1: Nature of onset of stuttering across gender and severity.

In the present study 45% of CWS had a sudden onset of stuttering. With regard to gender, around 50% of both male and female CWS exhibited a gradual onset. Earlier literature reported that stuttering in children had a gradual onset 70% of the time and a sudden onset only 30% of the time. The present data obtained is in agreement with Yairi & Ambrose, (2003) that a significant number of preschool children exhibit sudden onset of stuttering.

Analyzing the data in the present study, a correlation is also observed between sudden onsets and greater severity levels of stuttering. For both male and female CWS, sudden onsets were associated with moderate and severe stuttering. This result supports the findings of Yairi, Ambrose and Nierman (1993) and Yairi et al, (1996), who reported that a significant number of preschool children exhibit a sudden onset of moderate to severe stuttering. Comparing the results across gender, the present data reveal that for male CWS, severe stuttering was associated with a more sudden onset (60%) than moderate stuttering (50%) whereas for female CWS, there was no such difference. There was a 50% occurrence of sudden onset for both moderate and severe stuttering groups.

**(b) Current status:**

The current status of the condition was classified as progressive, static, regressive or fluctuating. Table 2 provides data regarding the current status data for different severity groups in male and female CWS.

Gender	Severity	Current condition				
		Static	Progressive	Regressive	Fluctuating	Total
Male	Mild stuttering	0 (0%)	2 (20%)	2 (20%)	6 (60%)	10 (100%)
	Moderate stuttering	2 (20%)	3 (30%)	5 (50%)	0 (0%)	10 (100%)
	Severe stuttering	1 (25%)	0 (0%)	3 (75%)	0 (0%)	4 (100%)
	Total	3 (12.5%)	5 (20.8%)	10 (41.6%)	6 (25%)	24 (100%)
Female	Mild stuttering	1 (10%)	0 (0%)	5 (50%)	4 (40%)	10 (100%)
	Moderate stuttering	1 (10%)	1 (10%)	4 (40%)	4 (40%)	10 (100%)
	Severe stuttering	0 (0%)	0 (0%)	4 (100%)	0 (0%)	4 (100%)
	Total	2 (8.3%)	1 (4.16%)	13 (54.16%)	8 (33.3%)	24 (100%)

Table 2: Current status of the condition across gender and severity

The present data indicate that among both male and female CWS more number of children were found to have a decline/regression in their disfluencies (Male CWS: 41.6%, female CWS: 54.16%). Several reports in the literature too indicate that in childhood the remission rates of stuttering are high (Yairi, 1997; Mansson, 2000; Yairi & Ambrose, 2005).

The current status of the condition is a good indication of the recovery from stuttering. When a regressive/fluctuating condition of stuttering is noted, it is a better predictor of recovery than a static/progressive condition. This can be accounted to the fact that stuttering in children, in the initial stages, is highly variable and the child often fluctuates between periods of normal fluency and mild stuttering (Van Riper, 1982).

Several reports in literature support the finding that female CWS are found to recover earlier than male CWS (Felsenfeld, 1997; Yairi & Ambrose, 1990; Yairi & Ambrose, 2004). The present study too agrees with the literature. This is because, careful analysis of the results reveals three major findings. The first of the findings being that majority of the female CWS had a regressive (54.16%) and fluctuating (33.3%) condition of stuttering, with only a minority exhibiting static (8.3%) and progressive (4.16%) condition of stuttering. For male CWS too, majority of the children reported a regressive (41.6%) and fluctuating (25%) condition of stuttering, but the reported percentage was lesser than that obtained for females. Also, there was a much higher percentage of occurrence of a progressive (20.8%) and static (12.5%) condition for male compared to female CWS.

The second finding is with respect to the gender and severity of stuttering. All the female children with severe stuttering were found to have a regressing condition of stuttering (100%), whereas for male CWS, it was only 75%. 80% of females with moderate stuttering were found to have a regressive (40%) and fluctuating (40%) condition of stuttering, whereas for male children with moderate stuttering, 50% were found to have a regressing nature of stuttering, while the remaining 50% reported a static and progressive condition. Within the mild severity level, 90% of the female CWS were found to have a regressive (50%) and fluctuating (40%) condition of stuttering, whereas 80% of the male CWS reported of a regressive (20%) and fluctuating condition (60%).

Data analysis thus provides significant evidence that female CWS have a better chance of recovery than male CWS.

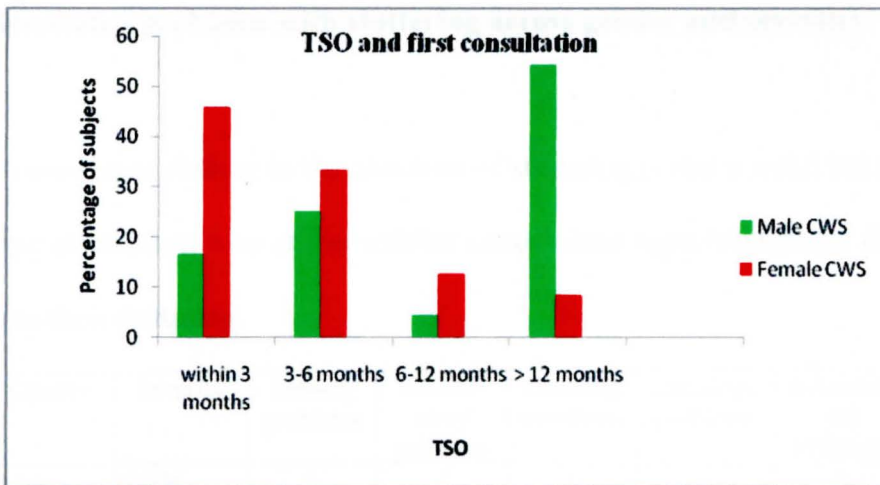
### **3) Time since onset (TSO) of stuttering and first consultation:**

Previous literature findings (Silverman & Zimmer, 1982) reported that the lag between the time of onset of stuttering and the time for initiation of any treatment was greater for female than male PWS. This finding suggests that female CWS were brought for evaluation and treatment much later than male CWS. However, the present data indicate that majority of female CWS were brought for evaluation much earlier than male CWS. Table 3 lists the details of the TSO and first consultation across gender and severity groups. Graph 2 denotes the TSO and first consultation across the gender groups.



Gender	Severity	TSO and first consultation				
		Within 3 months	3-6 months	6-12 months	>12 months	Total
Male	Mild stuttering	3 (30%)	4 (40%)	0 (0%)	3 (30%)	10 (100%)
	Moderate stuttering	1 (10%)	1 (10%)	0 (0%)	8 (80%)	10 (100%)
	Severe stuttering	0 (0%)	1 (25%)	1 (25%)	2 (50%)	4 (100%)
	Total	4 (16.6%)	6 (25%)	1 (4.16%)	13 (54.16%)	24 (100%)
Female	Mild stuttering	5 (50%)	3 (30%)	0 (0%)	2 (20%)	10 (100%)
	Moderate stuttering	5 (50%)	3 (30%)	2 (20%)	0 (0%)	10 (100%)
	Severe stuttering	1 (25%)	2 (50%)	1 (25%)	0 (0%)	4 (100%)
	Total	11 (45.83%)	8 (33.33%)	3 (12.5%)	2 (8.3%)	24 (100%)

Table 3: TSO of stuttering and first consultation across gender and severity



Graph 2: TSO of stuttering and first consultation across gender

The results obtained indicate that the TSO and initial consultation present opposite patterns in male and female CWS, unlike those reported in literature. In female CWS, majority of children were brought within 3 and 3.6 months of stuttering onset (45.8% - within 3 months; 33.3% - within 3.6 months). Only a minor group of children were brought after 6 months of the onset (12.5% -within 6-12 months; 8.3% -

after 12 months). In male CWS, the majority of the children were brought for initial evaluation after 12 months of the onset of stuttering (54.16%). 25% reported within 3-6 months and 16.6% reported within 3 months from the onset. A very minor group (4.16%) reported within 6-12 months of the onset of stuttering.

These findings suggest that there is no gender bias in parents in seeking help i.e., the views and conceptions regarding stuttering in females has progressed a long way through the years with female CWS also being identified and brought early for treatment.

#### 4) Associated problems with stuttering across gender and severity:

A consistent finding in the literature of stuttering is that a small but significant percentage of children who stutter exhibit concomitant speech/language disorders in addition to their stuttering.

Gender	Severity	Sensory problems	Articulatory problems	Learning problems	Language problems	Behavioural Problems	Total
Male	Mild stuttering	0 (0%)	2 (20%)	0 (0%)	1 (10%)	0 (0%)	3 (30%)
	Moderate stuttering	0 (0%)	1 (10%)	0 (0%)	0 (0%)	2 (20%)	3 (30%)
	Severe stuttering	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Total	0 (0%)	3 (30%)	0 (0%)	1 (10%)	2 (20%)	6 (60%)
Female	Mild stuttering	2 (20%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)	3 (30%)
	Moderate stuttering	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
	Severe stuttering	0 (0%)	0 (0%)	1 (10%)	0 (0%)	0 (0%)	1 (10%)
	Total	2 (20%)	1 (10%)	1 (10%)	0 (0%)	0 (0%)	4 (40%)

Table 4: Associated problems across gender and severity.

Phonological problems, articulation problems, language, learning and behavioral problems have been documented. There are also reports indicating that the occurrences of these problems are more in male CWS (Ryan, 1991; Stout & Conoley, 1992; Blood, Ridenour; Qualls & Hammer, 2003; Yairi, 2004). Table 4 depicts the associated problems across gender and severity of stuttering.

In the present study, male CWS had more associated problems (60%) than female CWS (40%). Male CWS often exhibited articulation problems (30%), followed by behavioral problems (20%) and language problems (10%). None of the male CWS had sensory impairments or learning problems. Also, male children with mild and moderate stuttering exhibited more associated problems. Female CWS exhibited more sensory problems (20%), followed equally by articulation and learning problems (10%). No behavioral or language problems were observed in female CWS. In addition, female children with mild stuttering were found to have more associated problems.

The occurrence of more language and behavioral problems in male CWS could be due to the fact that stuttering emerges during the period of greatest speech and language development. According to the literature, girls speak 1 month earlier than boys and are better and more proficient in language skills than the males (McGuiness, 1976; Smolak 1986; Shucard, Schucard & Thomas, 1987; Gazzaniga et al, 1988). Moreover, boys are considered as being four times more emotionally disturbed than girls (Stout & Conoley, 1992).

## 5) Duration of therapy attended across gender and severity:

Table 5 provides the details of number of males and female CWS who did/did not attend therapy and Table 6 depicts the details of the duration of therapy attended by the male and female CWS.

### (a) *Therapy for stuttering:*

Gender	Severity	Therapy		Total
		Attended	Not attended	
Males	Mild stuttering	8 (80%)	2 (20%)	10 (100%)
	Moderate stuttering	9 (90%)	1 (10%)	10 (100%)
	Severe stuttering	4 (100%)	0 (0%)	4 (100%)
	Total	21 (87.5%)	3 (12.5%)	24 (100%)
Females	Mild stuttering	6 (60%)	4 (40%)	10 (100%)
	Moderate stuttering	10 (100%)	0 (0%)	10 (100%)
	Severe stuttering	3 (75%)	1 (25%)	4 (100%)
	Total	19 (78.16%)	5 (20.83%)	24 (100%)

Table 5: Details of therapy across gender, severity.

Table 5 depicts that majority of male and female CWS attended therapy. Making a comparison between gender, more male CWS (87.5%) than female CWS (78.16%) attended therapy. Further, comparing the results across severity levels, all male children with severe stuttering attended therapy (100%) whereas only 75% of female children with severe stuttering did so. All female children with moderate stuttering attended therapy (100%) whereas 90% of males with moderate stuttering did so. Within the mild severity level of stuttering, more males (80%) than females (60%) opted for therapy. It can therefore be seen that there is an increasing awareness of stuttering among parents of CWS.

**(b) Duration of therapy:**

Table 6 provides the details of duration of therapy attended across gender and severity.

Gender	Severity	Duration of therapy attended			Total
		< 10 days	10-30 days	1-3 months	
Male	Mild stuttering	4 (50%)	3 (37.5%)	1 (12.5%)	8 (100%)
	Moderate stuttering	5 (55.5%)	2 (22.2%)	2 (22.2%)	9 (100%)
	Severe stuttering	1 (25%)	3 (75%)	0 (0%)	4 (100%)
	Total	10 (47.61%)	8 (38.09%)	3 (14.28%)	21 (100%)
Female	Mild stuttering	3 (50%)	3 (50%)	0 (0%)	6 (100%)
	Moderate stuttering	4 (40%)	4 (40%)	2 (20%)	10 (100%)
	Severe stuttering	1 (33.33%)	2 (66.66%)	0 (0%)	3 (100%)
	Total	8 (42.10%)	9 (47.36%)	2 (10.52%)	19 (100%)

Table 6: Details of duration of therapy attended across gender and severity

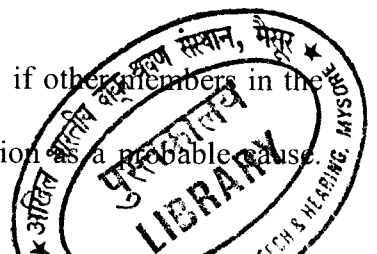
The results obtained reveal that majority of CWS attended therapy for duration of lesser than 10 days and upto 1-3 months. Only few CWS attended therapy for 1-3 months. Summarizing the results across gender, male CWS were found to have attended therapy for a longer duration (1-3 months) than female CWS.

**6) Causative factors across gender and severity:**

The causative factors for stuttering have long been investigated. In the present study, the factors have been grouped under 6 main headings- genetic, environmental, psychological, genetic and psychological, others and unknown. The results are shown in Table 7. Major causative factors reported across gender are plotted in graph 3.

Genetics is indicated as a causative factor in a CWS if other members in the family have a similar problem, rendering genetic transmission a probable cause.

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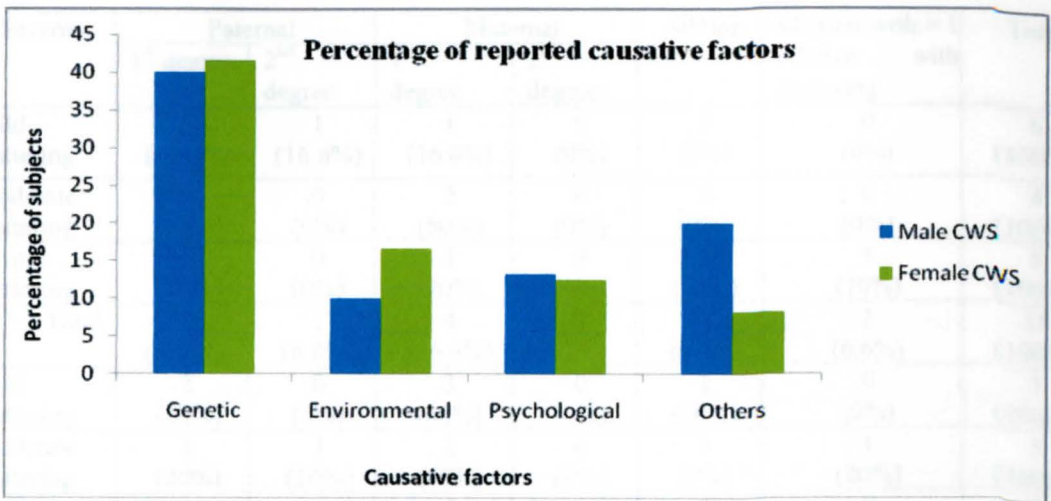
Environment is considered as a causative factor, if no genetic basis is reported and if the stuttering onset was suspected after imitation of stuttering, pressure from the environment etc. the classification of psychological included stuttering onset after fear from an object/event, frustration etc, again without a significant family history reported. The category of genetic and environmental includes the CWS who were reported to have a relative with stuttering in the family along with a history of contact with another person with stuttering, outside the family. Reported causative factors such as stuttering onset after illness, medication, consumption of cocoa products etc, were included under the category of ‘Others’. Few parents of CWS did not observe any of the above mentioned events as leading to the onset of the condition and had no clue as to why their child had stuttering. Such responses were categorized under ‘unknown’ causative factors.

Gender	Severity	Genetic	Environ-mental	Psycho-logical	Genetic, environmental	Others	Un-Known	Total
Male	Mild stuttering	5 (50%)	2 (20%)	1 (10%)	0 (0%)	1 (10%)	1 (10%)	10 (100%)
	Moderate stuttering	4 (40%)	1 (10%)	1 (10%)	0 (0%)	3 (30%)	1 (10%)	10 (100%)
	Severe stuttering	3 (30%)	0 (0%)	2 (20%)	0 (0%)	2 (20%)	3 (30%)	10 (100%)
	Total	12 (40%)	3 (10%)	4 (13.3%)	0 (0%)	6 (20%)	5 (16.6%)	30 (100%)
Female	Mild stuttering	5 (50%)	0 (0%)	0 (0%)	0 (0%)	2 (20%)	3 (30%)	10 (100%)
	Moderate stuttering	4 (40%)	2 (20%)	2 (20%)	1 (10%)	0 (0%)	1 (10%)	10 (100%)
	Severe stuttering	1 (10%)	2 (20%)	1 (10%)	0 (0%)	0 (0%)	0 (0%)	4 (100%)
	Total	10 (41.6%)	4 (16.6%)	3 (12.5%)	1 (4.16%)	2 (8.3%)	4 (16.6%)	24 (100%)

Table7: Causative factors across gender and severity

Etiology of stuttering is the most explored and also the most debated aspect in stuttering. There have been various theories and hypothesis attempting to explain the

etiology of stuttering. During the past few decades, the research conducted in this area has revealed a strong genetic component contributing to stuttering. (Andrews & Harris, 1964; Kay 1964; Kidd, Kidd & Records 1978; Kidd 1980, 1983, 1984; Ambrose, Yairi & Cox, 1993; Gupta, 2001; Anjana 2004). In the present study too, genetic factors dominate the causative factors in both, male and female CWS (40% and 41.6% respectively). Table 8 gives the details of proximity of relationship in paternal and maternal sides under genetic factor.



Graph 3: Major causative factors reported across gender

With respect to the family history of CWS, Andrews and Harris, (1964) and Kay, (1964) reported that female children who stuttered were more likely to have stuttering relatives than male children who stuttered. However, in the present study this was not observed. Both male and female CWS were found to have equal probability of having relatives who stuttered. This could be attributed to the fact that the study reported by the authors focused on children and adults, most of whom had been stuttering for several years. The present study supports the findings of Ambrose,

Yairi and Cox (1993) who found that male and female children who stutter had similar chances of having relatives who stuttered.

Moreover, the current results reveal that stuttering was more frequent in first degree relatives (both maternal and paternal) than the second degree relatives. This study supports the recent findings of Anjana, (2004) that the first degree relatives have a higher percent of stuttering compared to second degree relatives.

Gender	Severity	Paternal		Maternal		Sibling	subjects with > 1 relative with stuttering	Total
		1 <sup>st</sup> degree	2 <sup>nd</sup> degree	1 <sup>st</sup> degree	2 <sup>nd</sup> degree			
Male	Mild stuttering	4 (66.6%)	1 (16.6%)	1 (16.6%)	0 (0%)	0 (0%)	0 (0%)	6 (100%)
	Moderate stuttering	2 (50%)	0 (0%)	2 (50%)	0 (0%)	0 (0%)	0 (0%)	4 (100%)
	Severe stuttering	2 (40%)	0 (0%)	1 (20%)	0 (0%)	1 (20%)	1 (20%)	5 (100%)
	Total	8 (53.3%)	1 (6.6%)	4 (26.6%)	0 (0%)	1 (6.6%)	1 (6.6%)	15 (100%)
Female	Mild stuttering	1 (20%)	0 (0%)	3 (60%)	0 (0%)	1 (20%)	0 (0%)	5 (100%)
	Moderate stuttering	1 (20%)	1 (20%)	2 (40%)	0 (0%)	0 (0%)	1 (20%)	5 (100%)
	Severe stuttering	1 (100%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)	1 (100%)
	Total	3 (27.27%)	1 (9.09%)	6 (54.54%)	0 (0%)	1 (9.09%)	1 (9.09%)	11 (100%)

Table 8: Proximity of relationship in paternal and maternal sides under genetic factor

Comparing the males and females in the families of CWS, there were more male relatives than female relatives with stuttering. This supports findings of Wingate (1964), Kidd et al (1981) MacFarlane et al (1991), Anjana (2004), who found greater number of males than females in the families of PWS.

Results compared between gender reveal that majority of the male CWS were found to have male relatives of first degree (53.3%), whereas majority of the female



CWS were found to have female first degree relatives (54.54%). One sibling with stuttering was reported by both, one male and one female CWS. 6.6% of male CWS and 9.09% of female CWS had more than one relative with stuttering.

However, it is also true that genetic factors are not the sole cause of stuttering (Andrews et al 1991; Howie 1981; Kidd, Kidd & Records 1978; Yairi et al, 1996). The results obtained in this study too indicate the same. Table 7 depicts the other causative factors, in addition to the genetic factors. In male CWS, the second most reported causative factors included that of stuttering onset after illness and medication in the category of others (20%), and the third most reported factor was psychological (13.3%).

Early literature reports (Bloodstein & Smith, 1954; Goldman, 1967) indicated that male CWS were subjected to more environmental pressure. However, the present study does not support these findings. The current data indicated that environmental factors were the least implicated in male CWS (10%) and in female CWS, they were the second most reported causative factor (16.6%). These findings further reveal the difference in current perspectives of people towards female CWS. There has been greater awareness and concern about stuttering in females too over the years.

## **7) Type of stuttering:**

The type of stuttering in male and female CWS was explored. The results obtained are given in table 9. Results indicate that there was not much difference between male and female CWS. Both the groups had similar types and frequency of

disfluencies. Comparing SLDs in both male and female CWS, sound repetitions were found to be the most frequent disfluency type, followed by syllable repetition, single syllable word repetition, prolongation and blocks. In the category of ODs, multisyllabic word repetition was found to be the most frequent disfluency followed by revisions, interjections and phrase repetitions. This supports the results of the study by Anjana and Savithri, (2007) who reported similar results.

Gender	PERCENTAGE MEAN (%)								
	SR	SSWR	SYR	PR	BL	MSWR	PHR	INT	REV
Male	26.46	8.30	17.84	7.38	11.38	11.07	3.69	6.46	7.38
Female	25.12	9.35	12.80	8.37	6.89	11.82	5.41	9.35	10.83

Table 9: Type of stuttering across gender

(SR-syllable repetition; SSWR- single syllable word repetition; SYR- syllable/ part word repetition; PR- prolongation; BL-blocks; MSWR-multi syllabic word repetition; PHR- phrase repetition; INT- interjection; REV- revision).

**8) Recovery between male and female CWS across severity levels and as a group:** Estimation of recovery from stuttering was done in 2 ways.

***(a) Comparing the previous and current SSI-3 scores:***

To examine the recovery pattern in male versus females CWS, previous SSI-3 scores were compared with the current scores on SSI-3 (Riley, 1994). The results were compared between gender and across severity of stuttering.

Mann-Whittney U test was carried out to obtain the significance, if any between male and female CWS, with respect to previous and current SSI-3 scores as a whole group (ie, male CWS and female CWS) and within each severity level of stuttering (ie, previous and present scores of male children with mild stuttering versus previous and present scores of female children with mild stuttering). This

nonparametric test was used for the statistical analysis of these scores because the data were not normally distributed.

- (i) For children with mild stuttering (based on previous scores), the previous and present/current scores are shown in Table 10.

Male subjects	SSI scores		Female subjects	SSI scores	
	Previous	Present		Previous	Present
1	16	20	1	16	12
2	15	16	2	14	10
3	13	10	3	12	6
4	12	6	4	14	12
5	16	10	5	14	8
6	16	12	6	16	12
7	16	14	7	14	8
8	16	12	8	14	10
9	14	12	9	16	12
10	16	15	10	16	6

Table 10: Pre and current SSI scores for male and female CWS (mild stuttering)

The previous scores can be compared with the current SSI scores to examine the recovery in male and female CWS. Table 10 results show that male subjects 3, 4 and 5 and female subjects 2, 3, 5, 7, 8 and 10 presently obtained a score of less than 10 on the SSI-3 (Riley, 1994). This indicates that they can be classified as children with no stuttering (CWNS) as suggested by Coulter, Anderson & Conture, (2009). Therefore, better recovery was seen in female (6 out of 10) than male CWS (3 out of 10).

However, statistical comparison of previous and present scores across gender within the category of mild stuttering using Mann-Whitney *U*-test indicated that there was no significant difference between gender on previous and current scores of SSI-

3, in mild stuttering group ( $z = -1.77, p > 0.05$ ), which could be due to the fact that both male and female CWS recover better when they have mild stuttering.

(ii) For children initially classified as having moderate stuttering (based on the previous scores), the previous and current SSI scores are as shown in table 11.

Male subjects	SSI scores		Female subjects	SSI scores	
	Previous	Present		Previous	Present
1	25	25	1	18	10
2	20	18	2	23	10
3	23	21	3	18	12
4	24	15	4	23	8
5	23	14	5	22	10
6	26	23	6	20	17
7	22	17	7	17	8
8	19	17	8	19	14
9	25	24	9	21	17
10	20	18	10	22	14

Table 11: Pre and current scores for male and female CWS (moderate stuttering)

Table 11 clearly depicts the difference in scores between the male and female CWS. It can be seen that no male CWS obtained a score of 10 and lesser, to classify them as CWNS, whereas in female CWS, subjects 1, 2, 4, 5 and 7 obtained a score of 10 and less, indicating complete recovery in them. Male subjects 4, 5 and 7 previously diagnosed with moderate stuttering showed a steady decline in their scores, falling into the category of mild stuttering. Female subjects 3 and 10 also were found to have a regression in their scores, coming under the category of mild stuttering.

Therefore, summarizing the obtained results, it was found that more female CWS recovered than male CWS. There was complete recovery in 50% of the female CWS, with 0% of the males completely recovered. Partial recovery was exhibited by

20% of the female CWS and 30% of the male CWS. No recovery was found in majority of male CWS (70%), while only a minority of female CWS (30%) had no recovery.

Statistical analysis using Mann-Whitney revealed a significant difference between male and female children with stuttering with respect to the SSI-3 scores ( $z = -2.58, p < 0.05$ ), further supporting that female CWS have better chances of recovery than male CWS.

(iii) For children initially classified as severe stuttering (based on the previous scores), the previous and current SSI scores are shown in table 12.

Male subjects	SSI scores		Female Subjects	SSI scores	
	Previous	Present		Previous	Present
1	27	22	1	28	25
2	28	20	2	27	18
3	30	28	3	29	25
4	30	25	4	27	22

Table 12: Pre and current scores for male and female CWS (severe stuttering)

It can be observed from the table that all female CWS had partial recovery. 3 females were found to have moderate stuttering presently (subjects 1, 3 and 4) and one female was found to have only mild stuttering (subject 2). In male CWS, 3 of the subjects were found to have partially recovery, 2 recovered to a moderate severity level (1, 4 subject) of stuttering and 1 subject recovered better, having only mid stuttering currently (subject 2). 1 male subject was found to have no recovery (subject 3).

Therefore, in the category of severe stuttering, it can be seen that there was partial recovery for both male and female CWS. Also, there was 100% recovery in females whereas only 75% in male CWS.

Results of Mann-Whitney-U test indicated that there was no significant difference ( $z = 0.00$ ,  $p > 0.05$ ) between male and female CWS on the basis of SSI-3 scores in the severe category. However, the results need to be interpreted with caution due to the less number of subjects considered in both groups.

In addition, a Mann-Whitney-U test was carried out between gender on the previous and current SSI scores, as a whole, without dividing the subjects into different severity levels. The results indicated that there was a significant difference ( $z = -3.01$ ,  $p < 0.05$ ) between gender with respect to the previous and current SSI-3 scores. This implies that better recovery was observed in female CWS than male CWS.

Therefore, the present study is in support of majority of the literature findings that female CWS recover better than male CWS (Yairi & Ambrose, 1990; Felsenfeld, 1997; Yairi & Ambrose, 2004).

Kruskal-Wallis H test was conducted to find if there is any significant difference in recovery within females and male CWS. In case of both male and female CWS, no significant difference was obtained, ( $\chi^2 = 4.08$ ,  $p > 0.05$ ;  $\chi^2 = 21.8$ ,  $p > 0.05$  respectively).

*(b) By obtaining the type/frequency of disfluencies across gender and severity:*

The data was also analyzed to obtain the type and frequency of disfluencies. The results are discussed within each severity level (classified according to the previous SSI-3 scores) between gender groups.

(i) Frequency of SLD and OD in male and female CWS within the category of mild stuttering are shown in table 13.

MILD STUTTERING	Male subjects	Disfluency		Female Subjects	Disfluency	
		SLD	NSLD		SLD	NSLD
	1	7	4	1	9	2
	2	5	3	2	2	3
	3	2	3	3	1	2
	4	1	4	4	6	2
	5	2	3	5	2	4
	6	6	5	6	4	2
	7	8	4	7	2	3
	8	5	2	8	1	2
9	6	2	9	6	3	
10	6	4	10	1	2	

Table 13: Frequency of SLD and OD in male and female CWS (mild stuttering)

Table 13 results indicate that 3 male subjects (subjects 3, 4, and 5) had less than 2 SLDs per 100 words. Within female CWS, 6 subjects (subjects 2, 3, 5, 7, 8 and 10) had less than 2 disfluencies per 100 words of conversational speech. Therefore, these 3 male and 6 female CWS can be classified as CWNS (Pellowski & Conture, 2002).

(i) Frequency of SLD and OD in male and female CWS within the category of moderate stuttering are shown in table 14.

MODERATE STUTTERING	Male subjects	Disfluency		Female Subjects	Disfluency	
		SLD	NSLD		SLD	NSLD
	1	20	8	1	2	5
	2	16	4	2	2	6
	3	14	3	3	9	2
	4	9	3	4	2	3
	5	4	1	5	2	4
	6	22	5	6	11	2
	7	6	5	7	2	5
	8	14	4	8	7	2
9	21	7	9	7	2	
10	7	3	10	4	2	

Table 14: Frequency of SLD and OD in male and female CWS (moderate stuttering)

Within the moderate stuttering group, no male CWS were found to have less than 2 SLD per 100 words, whereas 5 female CWS were found to have so (subjects 1, 2, 4, 5 and 7). No male subjects with moderate stuttering was found to have recovered completely whereas 5 female subjects with moderate stuttering were found to have recovered completely, which supports the findings by Pellowski & Conture, (2002).

- (ii) Frequency of SLD and OD in male and female CWS within the category of severe stuttering are shown in table 15.

SEVERE STUTTERING	Male subjects	Disfluency		Female subjects	Disfluency	
		SLD	NSLD		SLD	NSLD
1	13	4	1	13	7	
2	9	2	2	11	3	
3	15	6	3	13	3	
4	14	4	4	8	5	

Table 15: Frequency of SLD and OD in male and female CWS (severe stuttering)

It was found that none of the male or female CWS had 2 or lesser disfluencies per 100 words of conversational speech and therefore, none of them can be classified as completely recovered.



Therefore, it can be seen that there is significant difference across the gender on various parameters of stuttering. Females CWS were found to have an earlier age of onset of stuttering, with the condition regressing/fluctuating with time compared to male CWS wherein later onsets were reported along with more of a progressive and a static condition of stuttering. Also, female CWS were brought much earlier for evaluation and treatment than male CWS. This reflects a possible change in the gender bias favoring male for evaluation and management reported in the literature. Male CWS had more concomitant problems than females, with language and behavioral problems the most associated. In terms of disfluencies, male CWS had more SLDs than female CWS. Exploration into the recovery from stuttering revealed significant differences across the gender. Female CWS were found to recover faster and better compared to male CWS.

Similar findings across the gender were obtained in terms of nature of onset of stuttering, wherein both male and female CWS had an equal proportion of sudden and gradual onsets. Type of stuttering did not differentiate male and female CWS. Both the groups had an equal frequency of occurrence of disfluencies, with sound repetitions being the largest.

## CHAPTER V

### SUMMARY AND CONCLUSIONS

The aim of the present investigation was to explore the gender differences, if any, in male and female CWS with regard to parameters such as age of onset, nature and type of stuttering, causative factors, associated problems, time since onset (TSO) and nature and duration of treatment taken. It was also aimed to compare the recovery rates across male and female CWS (as a group and within each severity level) using SSI-3 severity ratings and the percentage of SLDs vs. ODs.

24 male and 24 female CWS (10 mild, 10 moderate, 4 severe stuttering each) in the age range of 3-6 years were followed up and samples of monologue, dialogue, reading and writing were obtained. Questionnaire, SSI-3, Language Assessment Checklist and Articulation Test were administered to all the subjects. Analysis of the results revealed the following conclusions:

- Investigations into the age of onset across the gender revealed that both male and female CWS reported greater onset between 2-4 years of age. Also, female CWS were found to have an earlier age of onset of stuttering compared to male CWS. An almost equal number of male and female CWS reported onsets between 2-4 and 4-6 years of age.

- Considering the nature of onset, significant differences were not obtained across the gender. Both male and female CWS were found to have an equal proportion of sudden and gradual onsets.
- The current condition of stuttering revealed significant differences across the gender. Majority of the female CWS were found to have a regressive/fluctuating condition of stuttering whereas male CWS had more of a progressive/static condition of stuttering.
- A changing gender bias in bringing a child for evaluation and treatment has been observed, favoring female CWS as against the opposite trend reported in the literature. That is, majority of the female CWS were brought for evaluation and treatment much earlier than male CWS.
- Investigations into the etiology of stuttering reveal interesting observations. Genetic factors were the most reported in male and female CWS. Stuttering was more frequent in first degree relatives (both maternal and paternal) than the second degree relatives. Moreover, majority of the male CWS were found to have male relatives of first degree whereas majority of the female CWS were found to have female first degree relatives. Both male and female CWS were found to have equal probability of having relatives who stuttered. Environmental factors were the least implicated in male CWS and in female CWS they were the second most reported causative factor.
- Gender difference was not observed in the type of stuttering. Both male and female CWS were found to have an equal type and frequency of disfluencies. Sound repetition was the most frequent SLD. Multisyllabic word repetition was the most common OD observed for both male and female CWS.

- The occurrence of associated problems was found to be more in male CWS. Among the associated problems, language and behavioral problems were observed more frequently in male CWS whereas sensory, articulation and learning problems were observed more in female CWS.
- Therapy details revealed that more number of male than female CWS were found to have attended therapy. Also, male CWS were found to have attended therapy for a longer duration than female CWS.
- Mann-Whitney *U*-test indicated that there was significant difference across gender in terms of recovery, with more female than male CWS recovering.
- Comparing across gender and severity, significant difference was obtained for moderate stuttering severity levels.
- Comparison of SLD's vs. OD was also a good indicator of recovery. CWNS were found to have less than 2 SLDs per 100 words.
- The test-retest reliability on 10% of the subjects was found to be 98%.

**Limitations of the study:**

- Study was done only on 24 male and 24 female CWS, and severity groups were small
- Variables were tested only in CWS between 3 -6 years
- The period of follow up was not uniform for all CWS.

### **Future directions:**

- The pattern of recovery and relapse can be studied by including more number of male and female CWS with a long term follow up
- Comparison of various parameters on recovery and relapse patterns among the two gender groups may be made for identifying the prognostic factors for recovery and prevention of relapses.
- Recovery based on SSI scores could be compared with those reported by parents or caregivers in order to give weightage for variability of the problem across situations which they would be better able to report.
- The variables could be checked in lower and older age groups with smaller age intervals to know the age related changes if any in stuttering onset, development, recovery and relapses between the two gender groups.

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## APPENDIX

### QUESTIONNAIRE

Child's name: No: Age: Gender:  
Informant: Father/Mother/Others (specify) Date:  
Phone No: E mail:

#### ***I) ONSET:***

1. At what age did the child's problem begin?  
1) Below 2 years 2) 2 to 4 years 3) 4 to 6 years

#### ***II) NATURE:***

- 2) How did it start/develop?  
1) Sudden ; 2) Gradual
- 3) If sudden, did the problem start immediately after  
1) Illness 2) Injury 3) Trauma 4) Others (specify)

#### ***III) DEVELOPMENT:***

- 4) Since the onset how is the stuttering?  
1) Increasing 2) Decreasing 3) Static 4) Fluctuating

#### ***IV) SEVERITY:***

- 5) How severe do you feel is your child's stuttering now?  
1) Very mild 2) Mild 3) Moderate 4) Severe 5) Very severe

#### ***V) CAUSE:***

- 6) What do you think may be the cause for the stuttering?  
1) Familial 2) Environmental 3) Psychological 4) Do not know

#### ***VI) AWARENESS AND CONCERN:***

- 7) What is your reaction to the stuttering?  
1) Not concerned 2) Somewhat concerned 3) Highly concerned
- 8) What is the child's reaction to the stuttering?  
1) Not concerned 2) Somewhat concerned 3) Highly concerned

#### ***VII) CONSISTENCY:***

- 1) Consistent 2) Inconsistent 3) Not sure

**VIII) ASSOCIATED PROBLEMS:**

- 9) Does the child exhibit any other problems?  
1) Sensory problems 2) Motor problems 3) Learning problems 4) Any other (specify)

**IX) TREATMENT:**

10). Have you consulted any professional regarding your child's stuttering?

- 1) No 2) Yes

11). If yes, specify:

- 1) General physician 2) Pediatrician 3) Speech language pathologist 4) Others (specify)

12). How soon did you consult doctor/professional after knowing about stuttering?

- 1) Within 3 months 2) 3 to 6 months 3) 6 to 12 months 4) >12 months

13). What was the treatment given?

- 1) Speech therapy 2) Language therapy 3) Others (specify)

14). What was the duration of therapy taken if any?

- 1) 10 days 2) 10 to 30 days 3) 1-3 months 4) > 3 month

15). Was the treatment effective?

- 1) No 2) Yes

16). If yes (specify)

- 1) Child has completely recovered; 2) Stuttering has reduced; 3) Relapses present

17). If relapses present, what are the measures taken?

18). What do you think are the reasons for relapse?