Prevalence and Mode of Inheritance of Stuttering in Primary School Children in Cairo

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List of Abbreviations

ADHD	**:**	Attention Deficit Hyperactivity Disorder
ASHA	**:**	American-Speech-Language-Hearing-Association
DAT1	**:**	Dopamine transporter
DNA	**:**	Deoxyribonucleic acid
DRD2	**:**	Dopamine D2 receptor
DSM	**:**	Diagnostic and Statistical Manual of Mental Disorders
DβH	**:**	Dopamine β-hydroxylase
GNPT	**:**	Gluco Nacteyl-phosphotransferase
NAGPA	**:**	N-acetylglucosaminidase-1-phosphodiester alpha-N-acetylglucosaminidase
PDS	**:**	Persistent development stuttering
PKST72	**:**	The largest Pakistan family
TS	**:**	Tourette syndrome
WHO	**:**	World Health Organization

Introduction

Stuttering appears in all cultures and has been a problem for human kind for at least 40 centuries. It has been a controversial topic for decades concerning its definitions, etiology, different methods of assessment and its treatment. Stuttering is a disorder of the neuromotor control of speech, influenced by interactive process of language production, and intensified by learning process **(Peters and Guitar, 1991).**

American – Speech – Language -Hearing-Association (ASHA, 1999) defined fluency disorders as a deviation in the continuity, smoothness, rhythm, and/or effort with which phonologic, lexical, morphologic, and/ or syntactic language units are spoken.

Stuttering affects 4-5% of the people worldwide. It usually begins in children at three to six years of age, and as many as three-quarters of affected children eventually recover without any intervention. Ultimately, stuttering is persistent for only 0.5-1% of the population **(Rathi et al., 2006).** Stuttering is more prevalent in children because of the high incidence of the developmental dysfluency in this population. Developmental dysfluency is more common to occur by the time a child enters the school **(Cooper, 1987)**.

Aboul Oyoun (2000) reported that prevalence of stuttering was 0.29: 0.55% in both urban and rural areas in the Upper Egypt in a two year study of 1818 people.

Craig et al. (2003) stated that stuttering exhibits a strong gender difference in incidence. **Yairi et al. (1996)** found that stuttering beyond childhood is characterized by a significant bias towards males, with males out- numbering females by a ratio 3:1 while **Rathi et al. (2006)** found that males out-numbering females by a ratio 5:1.

Concerning family history and its role in stuttering, **Andrews and Harris (1964)** found that 30% of the stutterers had relatives who stutter. Children who have first-degree relatives who stutter are three times as likely to develop a stutter **Ward (2006).**

There are several theories which tried to explain the etiology of stuttering, yet none of these theories was satisfactory to explain the exact etiology. These theories are Organic theories which explained stuttering as disturbance of physiology and neurophysiology **(Travis, 1931 and Ingham et al, 2003)**, Neurotic theories which viewed stuttering as a result of anxiety, conflict and frustration **(Coriat, 1931 and Millar and Watson, 1992),** and Learning theories which viewed stuttering as avoidance response to different surroundings **(Shams and Sherick, 1967).**

Stuttering presents in the form of: overt stuttering and covert stuttering. Overt stuttering is characterized by core behavior such as syllable repetition, intraphonemic disruption, and prolongation. Covert stuttering is characterized by word substitution and interjection which help the patient to postpone, avoid, hide and decrease the impact of stuttering **(Starkweather, 1987).**

Aim of the Work

The aim of this work is to investigate stuttering prevalence among the primary students and to establish informative baseline data about the size and distribution of stuttering from a population- based survey in Cairo using questionnaires in order to provide a proper stratum for further research. Pedigrees would be done to suggest the mode of inheritance in order to know much about its etiololgy to provide proper services for these patients.

Normal Speech and Stuttering

Speech is not a simple movement; it is the result of large number of complex processes on various levels. In stuttering, difficulties of execution of the final product are what we hear **(Postma and Kolk, 1990).**

Levels of processing are: level of conceptualization, level of formulation and level of articulation. Level of conceptualization is where the concepts one likes to express are specified and transformed into a preverbal message; then follows the level of formation, during which preverbal message is transformed into verbal or linguistic form. This level includes process of grammatical encoding. Finally, level of articulation or speech production complies preparation of muscle command and motor command execution leading to speech **(Postma and Kolk, 1990).**

Fluency is the production of more or less continuous speech at a relatively rapid rate with optimum effort. The fluent speech has four components: continuity, rate, rhythm and effort **(Ambrose and Yairi, 1999).** Speech of normal subject is perceived as continuous and fluent because pauses are linguistically appropriate junctures, serving an important communicative function **(Starkweather, 1987).**

The rate of normal speech may reach 200 syllables/ minute. Rhythm of speech is the sense of the flow of speech one gets from the stresses, duration and timing of syllables. Fluent speech is effortless as there is no apparent muscular tension in the body or the voice **(Nicolosi et al., 1996).**

Normal speech is not totally fluent; it has normal dysfluencies and hesitations **(Peters and Guitar, 1991).** These normal dysfluencies are characterized by repetitions of whole/ part words and phrases, which the listener ignores as long as they do not affect intelligibility of speech **(Yairi and Lewis, 1984).**

Fluency disorders are defined by **ASHA (1999)** as a deviation in continuity, smoothness, rhythm and/ or effort with which phonologic, lexical, morphologic and/ or syntactic language are spoken. Dysfluencies in childhood can be classified into developmental stuttering and cluttering. **Dalton and Hardcastle (1977)** defined cluttering as uncontrollable speech. **ASHA (1999)** defined cluttering as a fluency disorder characterized by rapid and/ or irregular speaking rate, together with excessive dysfluencies. There are other symptoms as language or phonological errors and often attention deficit.

Differentiating between normal developmental dysfluency and stuttering is important (*Table 1*). In general, developmental dysfluency involves the repetition of whole