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Specific learning disorder in DSM 5 and speech language pathologist

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Abstract

Since 2000, it has been well established that literacy skills are the outgrowth of linguistic capabilities and Specific Learning Disorder (SLD) is a language based disorder. A definite role for the speech language pathologist in management of this group has been well elaborated by speech therapists (ASHA, 2001; 2004). However the same does not get reflected in the recent literatures like the DSM 5, neither is appreciated by many professionals. DSM 5 is a major tool based upon which SLD is managed. This paper critiques the prescribed DSM V criteria's to define SLD from a speech language pathologist perspective. The diagnostic features of SLD includes linguistically dependent skills like understanding language tasks, meta phonological skills like spelling & reading and higher cognitive functions like mathematical skills. On an average 85% of the reported symptoms are language based symptoms out of which 50% are language specific in nature, emphasizing the indispensable role of an SLP with SLDs.

Keywords: Learning Disorder, DSM 5, Speech Language Pathologist

Introduction

In the United States the DSM serves as a universal authority for psychiatric diagnosis, DSM classifications and guidelines are as well respected in India. Treatment recommendations, as well as payment by health care providers, are often determined by DSM classifications, so the appearance of a new version in 2013 has significant practical importance. It implies the professionals and the therapies recommended in the DSM shall be considered as valid for that disorder. Specific Learning Disorders (SLD) have been included in the recent PWD Bill (2014) and is most likely to be recognized as a disability by the year 2015-16. This would suddenly put forth the need to have well clear assessment and therapeutic guidelines and the define role of different professionals in the rehabilitation process.

Current literature indicates that 41,600,000 to 58,240,000 of the 416 million of children in India have learning disability (Krishnan, 2007; Krishnakumar, 1999; Mehta, 2003) [13]. This enormous population is more than the entire population of countries like Argentina, Kenya, Poland, Algeria and Canada (Wikipedia, 2011) [34], making it the most widespread disability (Suresh & Sebastian, 2003; Tandon, 2007) [27]. The course of reading disabilities can be reversed provided that the children are identified early and have explicit reading instructions (Swank & Catts, 1994; Stuart, 1999; Hiebert & Taylor, 2000; Berninger i, 2003) [28, 10, 2]. In spite of SLD being a widespread neuro behavioral condition, there is yet any standard diagnostic or assessment tool available for management of children with SLD especially for the Indian bilingual children. The aim of this paper is to critique the parameters based upon which DSM 5 describes SLD, the symptoms of SLD have been specifically analyzed and elaborated from a speech language pathologist perspective. This review is an attempt to look at how Specific Learning disorder (SLD) is described in the DSM 5 from a speech language pathologist perspective.

Learning to speak in any language places equal demands on the learner, so there is a fixed developmental sequence in learning to speak. A child comes up with the first word by 12 months, phrases by 2 to 3 years and simple sentences by 3- 4 years across all the languages of the world while the same is not true for acquisition of reading and spelling proficiency. In contrast to spoken language, which is a product of biological evolution, reading and writing are not necessarily biologically programmed and are cultural inventions (Lieberman, 1992; Chall, 1996; Paul, 2001) [16, 5, 20]. Most written languages are speech based (Van Atteveldt *et al.*, 2014) [32] and reading mobilizes a number of processes that are grounded in oral language (Synder & Downey, 1991; Butler & Cheng, 1998) [29, 4] and hence accessibility of the oral language

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knowledge is proportional to literacy skills.

SLD is a language based disorder and the prevalence of SLD varies between languages, this is yet to be appreciated in India although survey data comparing the prevalence of SLD across English and Indian Languages have indicated so since 2003. Recently a Chennai based Help-Child centre for Learning Difficulty study, points to a 16%-20% prevalence rate among students in city schools whereas in government and aided schools across the TN state shows a prevalence of only 0.015%. But the surveyors in the analysis do not ascertain this difference to any language specific reason rather the researchers assume that learning English and Tamil are the same and the low prevalence of SLD in Tamil is due to the Lack of awareness about SLD amongst Tamil Board teachers ("Lack of Awareness", 2014) [15]. This is a faulty assumption as English and Indian languages are different at the level of orthography which is reflected in their stage of acquisition and processing. The effect of language on emergence & prevalence of learning disabilities has been acknowledged in a cross sectional study conducted in Japanese by Uno (Wydell *et al.*, 2009). In their study, 495 Japanese primary school children (from 2nd Grade aged eight to 6th Grade aged 12) in Japan were tested for their reading, writing and other cognitive skills including phonological awareness (Uno *et al.*, 2006) [31]. The results showed that percentages of children who had reading difficulties (defined as those whose reading/writing/phonological tests' scores fell below $\pm 1.5SD$) in syllabic Hiragana, syllabic Katakana, and logographic Kanji were 0.2%, 1.4%, and 6.9% respectively – these figures were significantly lower than those reported in the studies in English (Shaywitz *et al.*, 1997; Snowling, 2000) or Danish (Elbo *et al.*, 1995) [7].

The results of Uno *et al.*'s (2009) study further lend support to the Hypothesis of *Granularity and Transparency*. Wydell and Butterworth (1999) argued that English orthography would require a fine tuning of the orthography-to-phonology mapping, because English orthography is not completely transparent at the subsyllabic level (i.e. smaller grain-unit than syllables). In contrast, the grain size for Kana is at the whole character level (i.e., greater grain-unit than graphemes), and its orthography-to-phonology mapping is transparent (one-to-one). Hence Japanese children in general find it easier to master reading in Kana. This is because, as Landerl *et al.* (1997) [12] argued for German, the phonological recoding of Kana is not a demanding task. Moreover, although the grain size for Kanji is either at whole character or whole word level, its orthography-to-phonology mapping is opaque (one-to-many). Consequently learning to read in Kanji for Japanese children is harder than that in Kana. The results thus indicate that reading Kanji may require different reading strategies or different cognitive skills to those required for reading Kana. If so, reading English may yet require different reading strategies to those required for Kanji or Kana. Wydell and Butterworth (1999) thus speculated that it is therefore possible to be a Danish or English-Japanese bilingual with monolingual dyslexia in Danish or English. This may be the reason of having a low prevalence of SLDs in Bengali & Hindi medium government schools as compared to high prevalence of SLDs in city based English medium school where the tests were given in English as compared to Bengali & Hindi.

To appreciate these variations, and shifting learning demands placed by English and Indian languages, the Psycholinguistic Grain Size Theory (Ziegler & Goswami, 2005) [38] needs a brief discussion. According to the psycholinguistic grain size theory, understanding phonological development is important

for understanding reading development, and understanding reading development is important for understanding skilled reading. As there are variations in the phonological structure and consistency of languages, there will be developmental differences in the grain size of lexical representations and reading strategies across languages. The lexical organization and processing strategies that are characteristics of skilled reading in different orthographies may be affected by differing developmental constraints. Reading acquisition in some languages happens early while in others it may take double or more time to attain the same level of acquisition. This is so as acquisition of reading & writing is influenced by the writing system of the language (Paul, 2001) [20]. Firth *et al.* (1998) [18] found that German children's non-word reading performance was already close to ceiling after as little as one year of reading instruction when compared to, the reading accuracy of English children which was much lower and did not reach comparable levels until the children had experienced three years of reading instruction (Ziegler and Goswami, 2005) [38]. Similarly the errors made in English and Hindi spellings differ in nature, reflecting the different processing demands put forth by both the languages (Gupta and Jamal, 2006) [9]. Everyone does not learn to read "uniformly" and different languages vary in terms of literacy acquisition, as the demands that writing system imposes on a reader are language specific.

Individuals learning to read are faced with three problems: availability, consistency and granularity of spelling to sound mappings (Ziegler & Goswami, 2005) [38]. Availability problem reflects deficit in conscious access of phonological units prior to reading. For instance when a new language is heard, it's difficult for the listener to identify the basic components of the language like, where a sentence starts and ends, which are the different words in the sentence and phonemes which make up the words. As the person gradually learns the language (access to the rules of the language) he/she can gradually identify that words are made up of sound units (phonemes) specific to the language and there are certain rules (phonology) to get the sounds connected to form words. Consciously knowing the phonology of a language and using it for reading and spelling is known as metaphonology. Metaphonological skills are defined as the ability to think about and talk about phonology (Bowen, 1998) [3]. To learn to read and write, connecting orthographic units to phonological units needs to be acquired. For instance, to read or spell the word "cat", effortlessly the reader has to consciously access the phonological units i.e.: sounds (/kæt/ can be broken down

into two syllables /kæ/ & /t / which in turn consists of three letters <c>, <a>, and <t>, in which <c> represents the sound /k/, <a> the sound /æ/, and <t> the sound /t /) followed by accessing the grapheme/ alphabetic representation (c-a-t) of each sound. The better the person knows the language, the better he/she can 'hear/perceive', "remember the sound sequences" and appreciate the sound units in the word. This would in turn help to select graphemes corresponding to the phonological units.

While learning English, children of India face the problem of availability as it is a non- native language. English is hardly fluent for 3- 5% of the population in India (Desai *et al.*, 2010) [6]. The most unifying hypothesis about the core deficits of developmental dyslexia is the representation, storage and/or retrieval of speech sounds (Ramus, 2003; Snowling, 2001) [22]. Thus knowing (accessing the phonology with ease) the language is a major factor influencing reading acquisition and ease of reading as it reduces the load on the memory of the reader.

A better understanding of the remaining two factors (consistency and granularity) requires the knowledge about the variation in the script of English and Indian languages. The grain size or granular size of the smallest orthographic unit representing phonology for English is an alphabet (small grain size) or an alphabet combination (a larger grain size). For Indian languages it is at the level of syllables which vary in terms of complexity. The grain size theory and morphological and orthographic transparency differences in languages emphasize the necessity for more cross-language and also longitudinal development research. Small grain size teaching works well in languages with consistent letter-sound correspondences, such as Italian, but less well in English. Hebrew, like English, uses a larger grain size (rhymes, whole words etc) for decoding (Cassandra, 2005).

English orthography is different from Indian languages so employing same teaching methods will not be worthy. In English, the basic unit of processing for reading and spelling is phoneme which is not very faithfully represented by an alphabet and so phonics and phonological awareness are the methods prescribed to teach English (Shervani & Taneja, 2013; Vellutino *et al.*, 2004; Hulme *et al.*, 2005) [11]. Unlike English, the script of Indian languages are read and spelled by taking syllables as the basic unit of processing, hence exposing the child to phonics of Indian language at the level of aksharas and its combinations would be a better method of teaching Indian languages. This is so as the syllables (aksharas) faithfully translate the sounds but are visually much complex as compared to English.

Assessment domains (APA, 2013)

The four criteria are to be assessed which includes individual history (developmental, medical, family & educational), school reports, psychological and educational assessments.

Although SLD is recognized to be a language based disorder the need to assess linguistic skills is not yet made mandatory by the DSM 5.

Diagnostic Features

Specific learning disorder is a neuro developmental disorder with a biological origin (interaction of genetic epigenetic and environmental factors affecting the brains ability to process verbal or nonverbal information) that is the basis for abnormalities at a cognitive level that are associated with the behavioral signs of the disorder (DSM 5, 2013). Since SLD has associated language based problems, management of SLD could not be exclusively through medical modality or by psychological/behavioral leads, the language domain needs to be addressed.

There are four criteria prescribed for diagnosis.

Criteria A:

Specific learning disorder is persistent difficulties learning key-stone academic skills with onset during the years of formal schooling. Key academic skills include reading of single words accurately and fluently, reading comprehension, written expression and spelling, arithmetic calculation, and mathematical reasoning. Academic skills unlike other developmental skills like walking, talking have to be taught explicitly (DSM 5, 2013).

As discussed, reading is a language based skill and the specific linguist skills affected in a person with SLD are the meta phonological skill. Assessment and remediation of metaphonological skills comes under the domain of a speech language pathologist. The need to target metaphonological

skills are not mentioned in the DSM 5. Word reading involves connecting written expressions to corresponding sounds (phonemes/ words /sentences) which again depends on how well the reader knows about the sounds of the language, the rules by which the sounds and the corresponding written forms are connected while standing alone and when they form words and sentences. There is no instance where a person can develop reading and writing without knowing to speak the language. Neither reading nor writing can be used to teach oral language.

The learning difficulties are persistent and not transitory in children and adolescents, meaning that the individual is not catching up with peers for at least six months inspite of extra help at home or school. Evidence of persistent SLD is suggested to be derived from previous cumulative school reports, portfolios of the child's work or clinical interview. (DSM 5, 2013).As many as 75-80% of children with SLD exhibit a language disorder and speech disorder (National Institute of health, 2002) The DSM 5criteria do not suggest of having a language evaluation done.

Criteria B:

The individual's performance of the affected academic skills is well below average for age or average performance that is sustainable by extraordinary high levels of support. In children, the low academic skills cause significant interference in school performance (reported by teachers and teacher's grades or ratings). In adults, there is avoidance of activities that require the academic skills. On the basis of clinical judgment a more lenient threshold may be used when SLD is supported by converging evidence from clinical assessment, academic history, school reports or test scores, as standardized tests are not available in all languages the diagnosis may then be based in part on clinical judgment of scores on available test measures. (DSM 5, 2013).

Criteria C:

A third core feature is that the learning difficulties are readily apparent in the early school years in most individuals. However, the learning difficulties may not manifest fully until later school years, by which time learning demands have increased and exceed the individual's limited capacities (DSM 5, 2013).

This indicate the scope of identifying SLD quiet early during initiation schooling (around 4-5 years of age), most of the tests which can be used at this stage would be tests which are language dependent hence the speech therapist needs to be involved at this point.

Criteria D:

Another key diagnostic feature is that the learning difficulties are considered "specific," for four reasons. That is they are not attributed to following reasons including, Intellectual disabilities; global developmental delay; hearing or vision disorders, or neurological or motor disorders.

Diagnosis of SLD

Diagnosis of SLD is based on the information gathered from family history, developmental history, medical history, educational reports, formal and informal assessments, previous and current manifestation and impact of SLD

Associated Features Supporting Diagnosis

Specific learning disorder is frequently but not invariably preceded, in preschool years, by delays in attention, language, or motor skills that may persist and co-occur with specific learning disorder. Many features associated with SLDs are also found in other neurodevelopmental disorders eg. ADHD,

ASD, communication disorders, developmental coordination disorder. There are no known biological markers of SLD neither cognitive testing, neuro imaging nor genetic testing are useful for diagnosis at this time.

Development and Course (APA, 2013)

Onset, recognition, and diagnosis of specific learning disorder usually occurs during the elementary school years when

children are required to learn to read, spell, write, and learn mathematics. Specific learning disorder is life long, but the course and clinical expression are variable (Table 1). Changes in manifestation of symptoms occur with age, so that an individual may have a persistent or shifting array of learning difficulties across the lifespan.

Table1: Indicates developmental course of children with SLD.

Pre -school children	Primary grades (grades 1-3)	Middle grades (grades 4-6)	Adolescents
a) Lack of interest in playing games with language sounds (e.g., repetition, rhyming)	a) problems in recognizing and manipulating phonemes (such as mat or top).	a) Mispronounce or skip parts of long, multi syllable words	a) Reading remains slow& effortful, &they show marked problems in reading comprehension
b) Trouble in learning nursery rhymes.	b) Unable to recognize common irregularly spelled words (e.g., said, two).	b) Confuse words that sound alike (e.g., "tornado" for "volcano").	b) Poor in written expression & in mathematical problem solving
c) Frequently use baby talk, and have trouble remembering names of letters, numbers, or days of the week.	c) They may commit reading errors that indicate problems in connecting sounds and letters (e.g., "big" for "got")	c) May have trouble remembering dates, names, and telephone numbers.	c) Frequently need to reread material to get the inferences
d) May fail to recognize letters in their own names	d) Have difficulty sequencing numbers and letters.	d) May have trouble completing homework or tests on time.	d) Avoid activities that may include reading and arithmetic.
e) Have trouble learning to count.	e) Have difficulty in remembering number facts or procedures for adding & subtracting	e) Have poor reading comprehension	e) Have ongoing spelling problems, slow and effortful reading.
f) Unable to recognize and write letters, may be unable to write their own names, or may use invented spelling.	f) May complain that reading or arithmetic is hard and avoid doing it.	f) Slow, effortful, and inaccurate reading, and they may have trouble reading small function words (e.g., that, the, an, in).	
g) They may have trouble breaking down spoken words into syllables (e.g., "cow boy" into "cow" and "boy").		g) They may have very poor spelling and poor written work.	
h) Trouble recognizing words that rhyme (e.g., cat, bat, hat).		h) They may get the first part of a word correctly, then guess wildly (e.g., read "clover" as "clock"), and	
		i) May express fear of reading aloud or refuse to read aloud.	

In preschool children, there are 9 symptoms out of & 8 (a,b,c,d,f,g,h,i) of them are language based and 3 (g,h,i) of them are language specific. In primary grades(1-3) symptoms which are indicated are 6 and out of which 4 (a,b,c,d) are language based and 3 (a,b,c) are language specific.0 In middle year children grade(4-6), there are 8 symptoms out of which 7 (a,b,d,e,f,g,h) are language based and 2(f,g) are language specific. In adolescence, out of 5 symptoms, 5 (a,b,c,d,e) are language based and 4 (a,b,d,e) are language specific. On an average, out of 28 symptoms, 24 are language based while the other 12 are language specific. More than 85% of the symptoms reported by DSM 5 are language based and out of the language based symptoms, 50% are language specific symptoms. So while managing reading and spelling, a speech therapist cannot be ignored. Further an SLP is well versed in addressing cross linguistic demands.

Culture-Related Diagnostic issues

These issues need cross-cultural appreciation of languages and how the orthography of a language is mapped to its phonology. This as well needs the appreciation of cross

linguistic influences of the languages on each other. Also, assessment should consider the linguistic and cultural context in which the individual is living, as well as his or her educational and learning history in the original culture and language (APA, 2013).

Conclusion

On an average 85% of the reported symptoms are language based symptoms out of which 50% are language specific in nature, emphasizing the indispensable role of an SLP with SLDs. There is a need for cross-linguistic research in this area especially comparing English and Indian languages in terms of pre-literacy skills and language specific management methods.

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