

## CLINICAL STUDIES ON LEARNING DISORDER IN AYURVEDA - A REVIEW

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### ABSTRACT

Learning disorders are defined as problems in securing of developmental skills, academic achievement, social adjustment and secondarily emotional growth and development as a consequence of perceptual and linguistic processing deficits. The prevalence of learning disorders is 15.17 % in Southern India. In ayurvedic classics no separate narrative of such disease is seen, but many times delayed developmental skills such as *Vākskalanam*, *alpamedha-smṛti* etc. are stated and different remedies are considered for them. The *Indriyās* (sense faculties), *Manas* (mind), *Buddhi* (intellect) are comprised in the process of *Jñānotpatti*. Any altered function in these components hampers the learning process. Even if several studies have been conducted in Ayurveda on Learning disorder, the area remains still non conclusive. This is an attempt to report the studies from the postgraduate institute for Ayurveda psychiatry, with the available conclusions so as to augment the accessible possibilities in the clinical practice.

**Keywords:** Learning disorder, Ayurveda, *Śamana*, *Ghṛta*, *Vaca*.

### INTRODUCTION

Learning disorders are among the most frequently diagnosed developmental disorders in childhood.<sup>1</sup> Specific Learning Disorder is characterized by persistent difficulty of learning academic skills in

reading, written expression, or mathematics, beginning in early childhood that is inconsistent with over all intellectual ability of child.<sup>2</sup> Learning disabilities (LDs) are diagnosed using both educational and medical

perspectives.<sup>3</sup> As of an educational perspective, the most frequently used definition is set up in the federal special education law, the Individuals with Disabilities Education Act (IDEA). IDEA defined a specific learning disability as a disorder in one or more of the basic psychological processes involved in understanding or in using language, spoken or written, which disorder may manifest itself in the imperfect ability to listen, think, speak, read, write, spell, or do mathematical calculations.<sup>4</sup> The medical perspective on Learning disorders is reflected in the Diagnostic and Statistical Manual for Mental Disorders (DSM) published by the American Psychiatric Association. According to DSM-5, the diagnosis of a specific learning disorder, main symptom is persistent difficulties in reading, writing, arithmetic, or mathematical reasoning skills during formal years of schooling. Symptoms may include inaccurate or slow and effortful reading, poor written expression that lacks clarity, difficulties remembering number facts, or inaccurate mathematical reasoning.<sup>5</sup>

The clinical presentation is quite variable with some children presenting primarily with complaints of poor academic performance whereas others can present with symptoms secondary to the poor academic performance which may include school refusal, oppositional behaviour, aggression, poor motivation for studies, low self-esteem, sadness of mood, crying spells, changes in sleep and appetite, excessive engagement in extracurricular activities, somatic complaints (pain symptoms, fatigue) and dissociative symptoms.<sup>6</sup>

Early intervention presupposes early identification. At present, there is no universally standardized screening procedure to guide referrals from schools. The children are referred for assessment by the school/teacher for reasons of failure and underachievement.<sup>7</sup> The parents showed lack of conceptual knowledge with regard to the Learning disorder symptomatology as well as proper guidelines to deal with their child's problem. They displayed negative attitudes and reactions toward their child's diagnosis of Learning Disorder such as rejection, denial, over-protection and loss of hope.<sup>8</sup>

Remedial Education is a process to help the child acquire age appropriate skills in all his foundation areas which are required for attaining knowledge at his pace and potential. They should include direct teaching, learning and time for consolidation. Repeated revision is to be factored in as attention is variable. Depending on the type and severity of the problem, an individual educational plan is made for the child.<sup>9</sup>

Learning Disorder –Role of Ayurveda

In ayurvedic classics no separate description of such disease is seen, but many times delayed developmental skills such as *Vākskalanam*, *Alpamedha-Smṛti*, etc are mentioned and different remedies are described for them.

The *Indriyās* (sense faculties), *Manas* (mind), *Buddhi* (intellect) are involved in the process of *Jñānotpatti*. Any altered function in these components hampers the learning process. Impaired function of *Dhī* disables the person from judging the things properly.<sup>10</sup> *Dhṛti vibhramśa*<sup>11</sup> leads to loss of control over *Indriya* in sustaining perception. Due to *Smṛti Vibhramśa*<sup>12</sup> *buddhi* of a person become confused. *Manas* covered by *rajas* and *tamas* causes many emotional and behavioural problems, which causes barriers in Learning.

*Cikitsa* including *Nidāna Parivarjana*, *Doṣa Pratyānīka Cikitsa*, and *Vyādhi Pratyānīka Cikitsa* are used for Learning disorder. A couple with a healthy environment and a perfect regimen together with devotion throughout the preconception, conception, antenatal, natal and postnatal period will have a healthy and disease-free baby. *Doṣa Pratyānīka Cikitsa* corrects the improper balance of both *Sārīrika* and *Mānasika Doṣas*, which will break the pathogenesis of disease. *Vyādhi Pratyneeka Cikitsa* deals with specific measures which will help to correct the disorder irrespective of the cause of disease.

The *Medhya Rasāyana*<sup>13</sup> which includes *Mandūkāparni*, *Madhuyaṣṭi*, *Gudūci* and *Sankhupuspi* are specifically indicated for improving the intellectual abilities. Non-medical interventions like *Buddhi Medhākara Gaṇa* is also used. It includes *Satatādhyayana* (repetitive learning), *Vāda* (debates and discussion), *Paratantrāvalokana* (learn from all

discipline), *Tadvidya Ācaaryaseva* - accompanying the masters of that field.<sup>14</sup> *Satvāvajaya cikitsa*<sup>15</sup> including *Jñāna*, *Vijñāna*, *Dhairya*, *Smṛti* and *Samādhi* are described for mental ailments. Hence counselling of the parents, family members, teachers and child itself is of great help in the management of Learning Disorder. However abundant active formulations and treatment protocols were proved to be effective in managing Learning Disorder, concluded by the studies conducted, they are not published and so propagation of knowledge that may improve clinical practice are requiring. This article is an initial effort to deliver a vision into the research works conducted in the area of Learning Disorder which can be a needle towards further research.

### **Aim and Objectives**

To augment the magnitude of Ayurvedic management of Learning disorder

To propagate the results of the concluded studies of Learning disorder in Ayurveda

To provide guidelines for further research in Learning disorder.

### **Materials and Methods**

All the available dissertation works completed in the area of Learning disorder in the department of Kayachikitsa, VPSV AVC, Kottakkal were gone through in detail and were analysed.

### **Summary of clinical studies**

#### **1. Gopalani Ajay (2005)- Effect of Brahmi Ghrta on specific developmental disorders of scholastic skills**

A conceptual study and a clinical trial were done in specific developmental disorders of scholastic skills (SDDSS). 20 subjects in the age group 7-10 years were selected based on inclusion and exclusion criteria. They were observed for 1 month. In treatment group *Brahmi Ghrta* 10 ml with warm water *Anupāna* and in control group plain *go Ghrta* 10 ml with warm water *Anupāna* were administered. A survey was also included in this study and the aim of the survey study was to get the prevalence of the disorder in a school in a local area with 200 sample. Out of 200 children observed, the prevalence rate of SDDSS was 38%. The trial drug *Brahmi ghrta* was very much useful in improving score

of overall SDDSS assessment. It was found to be very effective in improving score of writing alphabets, writing words and writing paragraph. It was very effective in increasing the score of IQ of children with SDDSS as t value was highly significant at 0.1 level ( $p < 0.001$ ), and it was useful in increasing both verbal IQ and performance IQ. It showed significant improvement in measure of a person's visual imagery, visual motor integration and immediate memory recall. The study concluded that the trial drug could be useful in enhancing the learning by improving aforesaid abilities.

#### **2. A study on the effect of Vacādi ghrta in Learning disorders by Nikhila Chandran (2009).**

This study was a randomised controlled trial to assess the effect *Vacādi ghrta* in learning disorders among 20 subjects of age between 7-12 years. 10 subjects were in treatment group *Vacādi Ghrta* and 10 in control group plain *Ghrta* with a dose of 10 ml morning and evening with warm water *Anupāna* for a duration of 2 months. Total 3 assessments were done with Learning disability assessment material scoring based on assessment scale from ICCONS, Shornur, Rajas tamas scoring scale and Children's nonverbal learning disability scale before starting the treatment, after 2 months of treatment and after 2 months follow up. The study concluded that the effect of *Vacādi Ghrta* is highly significant in the total learning disability assessment score with 26.89% relief, highly significant in writing skills with 25.24% relief, in reading skills 54.02% relief, mathematical skills with 17.2% relief. The effect of *Vacādi Ghrta* after follow up also highly significant with 37.3% relief.

#### **3. "A RCT on the effect of Vaca cūrṇa in the management of Learning disorder with special reference to Reading disorder (dyslexia)" by Neetha S Vijayan (2011).**

This study was on the effect of *Vaca Cūrṇa* in the management of Learning disorder with special reference to Reading disorder (dyslexia) among 20 subjects of age between 6-12 years satisfying the diagnostic criteria. This was a randomised controlled trial with trial group *Vaca Cūrṇa* 250 mg with plain

ghee 5 ml with time of administration 7pm and the control group 5 ml plain ghee. The duration of treatment was 2 months with 1 month follow up. Assessment was done with Malin's IQ Scale, Learning disability assessment score, Rajas and tamas assessment scale. This study concluded that *Vaca cūrṇa* has got significant effect in reducing the signs and symptoms of dyslexia when compared with control  $p < 0.05$ .

#### 4. Efficacy of an *Āyurveda* treatment package in the management of Specially Identified Scholastic Backwardness - An open clinical trial by Dr Sangeetha G (2015)

This was an open clinical trial to assess the efficacy of an ayurvedic treatment package in the management of scholastic backwardness. The Sample size was 30 and the duration of intervention was 2 months. Intervention started with *Aṣṭa Cūrṇa*: 3-5gm with hot water just before food, morning and evening and *Krmighnavati* 1 tablet with hot water in empty stomach at morning for 7days. *Kūsmānda svarsā Ghrta* 10ml mixed with *Vaca Cūrṇa* (0.25-0.5gm) and *Sankhapuṣpi Cūrṇa* (500 mg) after food, morning and evening was given for the remaining of 2 months. Yoga package includes *Sūkṣma Vyāyāma*: (toe walking, joint rotations, muscle tightening and loosening exercises), *Sūryanamaskāra*, few *Yogāsana*s, *Aakāra*, *Ukāra*, *Makāra* chanting, and *Trātaka*. Assessment was done with Cognitive processing inventory scale (CPI). In Auditory processing, showed 9.8% improvement with  $p < 0.001$ , visual processing showed 11% improvement with  $p < 0.001$ , sequential processing showed 9.54% improvement with  $p < 0.001$ , conceptual processing showed 11.5% with  $p < 0.001$ , the processing speed showed 10.6% with  $p < 0.001$  and the executive functioning showed significant result with  $p < 0.001$ .

## DISCUSSION

### Discussion on conceptual part

As far as Learning Disability is concerned the conceptual part of all the studies pointed to the detail that *ātma*, *indriya*, *mana* and *artha* are the four basic

components required in Learning. Acarya Caraka described *buddhi* as *Samam buddhirhi paśyati* i.e. the intellect views things as normally as they are. *Cakrapāni* has explained the type of *Buddhi* as *Dhī*, *Dhṛti* and *Smṛti*.<sup>16</sup> *Dhṛti* is *Niyamātmika* i.e. the controlling factor which controls the *manas* from indulging in harmful *Indriyārthās*. That is why the importance of association of *Dhṛti* with *manas* has been stressed under the function of *manas* in the context of *svanigraha*.<sup>17</sup> So *Dhṛti* helps to sustain attention and concentration which are very essential for cognition. *Smṛti* means the ability to recall things, the factor that recalls the past experiences. *Buddhi* can function properly only with the help of *Smṛti* as it is one of the essential factors which is responsible for the attainment of deepest level of knowledge (*Tatvajñāna*). In Learning disorder, *Mano Vibhrama* also arises; the person thinks matters which are not worthy of thinking and does not think matters which are worthy of thinking.<sup>18</sup> According to *Caraka*, the qualities of good disciple were described as presence of tranquillity, generosity, aversion to mean acts, intellect, power of reasoning, memory, unimpaired senses, modesty, absence of ego, ability to understand the real meaning of things, absence of irritability, love for study, enthusiasm, devotion to study and absence of greed and laziness. In this intellect, power of reasoning, memory, unimpaired senses are the main factors influencing the learning-disabled child. Hence it is clear that any abnormality in above mentioned areas can cause learning disorder.<sup>19</sup>

Relation between *manas* and *Agni* was also documented. Normal mental functioning is closely related with *Agnibala* and *Rasadhātu* in the body. *Mana tuṣṭi* is accredited by *Rasadhātu* and its *Kṣaya* causes *mana śūnyata*<sup>20</sup> i.e. improper functioning of mind. The improper formation of *Rasadhātu* further leads to the improper development of all the other *Dhātu* and finally results in *ojakṣaya*.<sup>21</sup> *Ojakṣaya* will ultimately lead to *ajnāna*<sup>22</sup> i.e. defective cognition.

### Discussion on treatment part

In treatment aspect *Āyurveda* gives importance to preventive measures, which can be on track even from the preparation of the couple for the conception,

because the aetiology can be considered through *Sahaja*, *Garbhaja*, *Jātaja*, *Mānasika* or *Karmaja Nidāna* and there occurs *Tridoṣa Duṣṭi* and *Manovaha Srothoduṣṭi*. Use of *Medhya Rasāyana* and *Adhyayana* can lessen the difficulties in academic skills. *Brahmi Ghṛta* was the classical preparation that has significant effect in improving IQ of children. There were various references for *Brahmi Ghṛta* in our classics, but in the study by Gopalani Ajay(2005) it was taken from the *Aṣṭāṅghṛdaya Balopacaranīya Adhyāya* that focuses improving *Vāk*, *Medha* and *Smṛti*.<sup>23</sup> *Brahmi*, *Śariba Saindhava* and *Goghṛta* are labelled to be *Śīta Vīrya* and *Tridoṣaghna*. The other four drugs *Siddhārthaka*, *Vaca*, *Kuṣṭa* and *Pippali* are *Uṣnavīrya* and *Kaphavāta Hara*. So, this combination can be used in conditions of *Tridoṣa* vitiation or in condition where there is obstruction to *Srotas* caused by *Kapha* and *Vāta*.

*Vaca* is a potential drug that can be permitted in the management of Learning disorder. Single drug *Vacā Cūrna* was tried alone, *Vacā Cūrna* as a part of protocol and as *Vachādi Ghṛita*. *Doṣahara* property *Vaca* is chiefly *Kaphavāta Śamana*.<sup>24</sup> By its *Tikṣṇa Guna* and *Uṣnavīrya*, *Vaca* clears vitiated *Kapha* and thus upholds *srotośodhana*. *Vaca* by its *Srotośodhana* property helps to remove the *Āvarana* of *Tamas* and *Rajas* and thus might help to the memory.

Most of the drugs in *Vacādi Ghṛta* were *Srotośodhaka* and *Kaphavātahara*, it surely removes the obstruction due to *Āvarana* of *Kapha*. Because of the *Kapha Doṣa* decreases, *Tamodoṣa Āvarana* also reduces. The outcome of drug is highly significant in reducing *Tamodoṣa*. The overall achievement finally benefits the proper functioning *Indriya Pravarthana* through clear *Buddhi*.

In the protocol study by Sangeetha G, the treatment is planned in three domains i.e. to enhance *Agnibala*, to improve the quality of *rasa*, and to make *Satvaśuddhi* (clarity of psyche) for a better output in learning. For the accomplishment of *Agnidīpana* and *Rasaśuddhi*, *Aṣṭacūrna*<sup>25</sup> and *Krimighna Vati*<sup>26</sup> were given. *Aṣṭacūrna* is a traditional Aayurvedic formulation widely used in Kerala for various ailments like *Agnimāndya*, *Sūla*, *Gulma* etc and it is

mentioned in *Aṣṭāṅghṛdaya Gulma Cikitsādhyāya* and most of the ingredients were *Vātakaphahara* and *Krmighna* in nature. *Krmighna Vati* was also *Vātakaphahara* and it improves the functioning of *Rasa Dhātu*. *Kūsmānda Svarasa Ghṛta*<sup>27</sup> along with *Śveta sankhapuṣpi*<sup>28</sup>, *Vaca Cūrna* and Yoga package is chiefly intended to impart *Satvaśuddhi*. Here *Kūsmānda Svarasa Ghṛta* is given after *Dīpana* so that further renovation and nourishment of *Rasadhātu* is obtained. *Kūsmānda Svarasa Ghṛta* is also a potent *Medhya* formulation which is indicated as “*Dhee Vāk Smṛtipradam*”. As both the *Kūsmānda* and *Yaṣṭi* in this formulation were *Madhura Rasa*, it also contributes *Brmhana* quality. The region of the planum temporale has received the most attention from researchers, as it is believed to play a pivotal role in the neurolinguistic deficits typically reported in dyslexia.<sup>29</sup> Children with Developmental Dyscalculia showed prominent grey matter deficits in both dorsal and ventral visual streams as well as the anterior temporal cortex. Children with Developmental Dyscalculia also showed significant deficits in the ventral visual stream, within the medial aspects of the inferior temporal gyrus.<sup>30</sup> So *Ghṛta* preparations like *Kūsmānda Svarasa Ghṛta*, *Vacādi Ghṛta*, *Brahmi Ghṛta* were used in most of the study. Vagbhata has described *Mastulunga* as composed of *medas*.<sup>31</sup> Dalhana as stated that *Mastulunga* is *Mastaka Majja* resemble partially melted *ghṛta*.<sup>32</sup> This suggest the relation between *Ghṛta* and *Mastulunga*. *Ghṛta* enhances *Dhī*, *Smṛti* and *Medha*.<sup>33</sup>

The drugs in the form of ghee easily passes through blood brain barrier and quickly absorbed in the target areas of CNS, because it has a lipophilic molecular structure. Over half of the brain's dry weight is comprised of lipids, and it is especially enriched in long-chain omega-3 (*n-3*) polyunsaturated fatty acids (PUFAs), signifying a key role for these molecules in the optimal development, maturation and aging of neural structures and networks. There is a decisive role of nutrition in brain development, and thus on brain function and mental performance in humans.<sup>34</sup> Likewise ghee has antioxidant property which

performances on the degenerative brain cells.

### Discussion on result

Effect of *Brahmi Ghṛta* on specific developmental disorders of scholastic skills by Gopalani Ajay (2005) revealed significant improvement in measure of person's visual imagery, visual motor integration and immediate memory recall. A study on the effect of *Vacādi Ghṛta* in Learning disorders by Nikhila Chandran (2009) concluded that the effect of *Vacādi ghṛta* is highly significant in the total learning disability assessment score with 26.89% relief. A RCT on the effect of *Vaca Cūrṇa* in the management of Learning disorder with special reference to Reading disorder (dyslexia) by Neetha S Vijayan (2011) proved that *Vaca Cūrṇa* has got significant effect in reducing the signs and symptoms of dyslexia when compared with control  $p < 0.05$ . Efficacy of an *Āyurveda* treatment package in the management of Specially Identified Scholastic Backwardness - An open clinical trial by Dr Sangeetha G (2015) substantiated that there was improvement in all the domains of Cognitive processing inventory scale  $p$  value  $< 0.001$ .

### CONCLUSION

Learning Disorder (LD) is an unnoticed disorder troubling many and triggering high degree of impact. Parenting patterns also affect the way children learn to learn. The counselling methods, individual education program also incorporated with Ayurveda treatment modalities with yoga practices were most beneficial to the buds of society. Here *Brahmi Ghṛta*, *Vacādi Ghṛta*, *Vaca Cūrṇa*, *Kūsmānda Svarasa Ghṛta* and *Sankhapuṣpi Cūrṇa* were discussed under Learning disorder. Ayurveda management strategies such as various *Śamanouśadas*, *Medhya Rasāyana*, *Satvāvajaya Cikitsa* and yoga therapy can be excellently exploited in this condition. By analyzing the reported studies conducted, it points towards the significant effect in Learning Disorder. This stresses the significance of guiding further research in the field of Learning Disorder in Ayurveda integrated with other techniques. Publishing previous work in these areas concretes inventive pathway for further studies.

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