PREVALENCE OF DEVELOPMENTAL COORDINATION DISORDER AMONG LEARNING DISABILITIES

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ABSTRACT

BACKGROUND: Learning Disability (LD) is considered to be one of the important factor among school going children. 50% of Learning Disability prone to have motor proficiency deficits. Developmental Coordination Disorder (DCD) is characterized by impairments of motor coordination and affecting individual’s motor functions of daily living activities and academics.

OBJECTIVE: To find the prevalence of Developmental Coordination Disorder among Learning Disabilities.

METHODOLOGY: Study design was non-experimental, Study type was observational (Survey), Sampling method was convenient sampling, and Study setting was at SRM Medical Hospital and Research Centre, Paediatric Clinics in and around Chennai.

PROCEDURE: Children with known case of Learning Disability (LD), who satisfy the inclusion and exclusion criteria were selected and an informed consent was obtained from the parents with detained explanation of procedure. A diagnostic test of Developmental Coordination Disorder questionnaire (DCD-07) was used to suspect DCD with the help of scoring and Bruininks Oseretsky Test of Motor Proficiency to check Motor proficiency deficiency.

OUTCOME MEASURE: The outcome measures are Developmental Coordination Disorder Questionnaire (DCD-07), Bruininks Oseretsky Test for Motor Proficiency- 2nd edition.

RESULTS AND CONCLUSION: The results shows that there is no statistical significance between Developmental Coordination Disorder and Learning Disability, but according to the individual scoring in motor proficiency test it showed that the Learning Disability have scored less in fine and gross motor function.

Keywords: Developmental Coordination Disorders, Learning Disability, Bruininks Oseretsky test

I. INTRODUCTION:

Development is a process of continuous learning qualitatively and quantitatively. The progressive change in the nervous system. [1] Learning Disability (LD) is considered to be one of the important factor among school going children. Learning disabilities are identified first by the teachers in school, through parents and later on by therapists. There are majorly four types of Learning Disability such as dyslexia, dysgraphia, dyscalculia and dysmetria. [2]
Motor Proficiency is purely a hand and mind function. In childhood the motor proficiency is lesser and as the age progress improvement of motor function is also present. Learning Disability are 50 % prone to have motor proficiency deficits.[3,4]

Developmental Coordination Disorder (DCD) is characterized by impairments of motor coordination and affecting individual’s motor functions of daily living activities and in academics [5]. Among the school children about 5-6% are known to be with Developmental Coordination Disorder [6]. The ratio of male to female is about 2:1, and are classified into mild, moderate or severe according to the scoring from the DCD questionnaire [7].

Considering the importance of early intervention of the children with learning disability, the motor proficiency has to be checked as age progress for all children starting from pre-primary to secondary school [8].

Among the school children, in 2007, about 7.8% of children are considered to be (LD) where 3.7% of mild and 4% with moderate and severe [9]. In Southern India, 0.8% children were found to have DCD, where girls (1.1%) and boys more than (0.8%) [10].

The clinical presentation of DCD depends on the source of severity, motor skills affected and environmental influences [11]. Researchers have shown that children with DCD have deficits in gross and fine motor skills, postural control and proprioception with motor impairments manifesting in poor upper and lower limb movements [12].

The age group between 5-14 years of school going children are more prone to have Developmental Coordination Disorder as per many researchers. So this age group should be more concentrated by the teachers, parents and therapists [13].

In many pediatric centers, Learning Disability children are taught with physical activity and cognition activities where they use for their daily life. But the sad part is many therapists miss out their motor proficiency [14]. Motor proficiency of child is very important as it is also one of the part of development in their life.

The motor proficiency consists of activities that enhance the performance of child in all aspects of life, such as balance, visual- motor, bilateral coordination, running speed and agility etc. [14].

These help in their day to day activities such as coping from board is an example of visual-motor coordination, walking in a line is a factor of balance and playing activities whether it may be indoor or outdoor the child needs running speed, response speed, bilateral coordination and agility [14,15].

The importance of physical activity for health, growth helps in improving the motor skills for improving daily living activities. Most of the motor proficiency activities are activated during playing, but in these days children tend to use electronic gadgets and miss out the nature of games.

Learning Disability should be investigated with DCD and motor proficiency as an early intervention in all school going children to prevent secondary complications. Since there is correlation between all the symptoms between the LD and DCD, there are chance of lesser motor proficiency among Learning Disability children [16].

Understanding the complex nature of DCD and developing interventions to improve motor skills and functional activities of daily living in small group of population will be useful for neglecting major population with DCD [17]. The need for the study was to identify Learning Disability among school children which is not done properly by the teachers and parents. Through their academic performance identification of Learning Disability is found. And the children were concentrated more upon the academic procedure.

This study helps all the therapists, teachers and parents to check and rule out the Developmental Coordination Disorder among school children and to improve in motor proficiency as it is very important for daily activities.

II. METHODOLOGY:

Study design was non-experimental, Study type was observational (Survey), and Sampling method was convenient sampling. Study setting was at SRM Medical Hospital and Research Centre, Paediatric Clinics in and around Chennai. Ethical committee clearance was taken from SRM college of Physiotherapy. The inclusion
criteria are children with age group of 5-12 years, a known case of Learning Disability and children who satisfies DCD criteria, exclusion criteria’s children with orthopaedic or neurological problem, severe coordination disorder and visual deficit children, outcome measures were taken using Developmental Coordination Disorder Questionnaire (DCDQ-07). Bruininks Oseretsky Test for Motor Proficiency- 2nd edition.

33 children with known case of Learning Disability (LD), who satisfy the inclusion and exclusion criteria were selected with convenient sampling and an informed consent was obtained from the parents with detailed explanation of procedure.

A diagnostic test of developmental coordination disorder questionnaire (DCD-07) was used to suspect DCD with the help of scoring will be done accordingly with the help of teachers or parents. According to the scoring the children were classified into mild, moderate and severe [18, 19].

The selected children with Learning Disability (LD) was checked with the motor proficiency using Bruininks Oseretsky Test. Bruininks-Oseretsky test for motor proficiency is one of the most reliable test for gross and fine motor consists of 8 subtests- running speed and agility, balance, bilateral coordination, strength, upper limb coordination, response speed, visual motor control and upper- limb speed and dexterity with a total score of 320 [20].

Each subtests contains of many activities with the scoring, in addition of all scores were evaluated. The total score for each child is checked with 320 as the scoring is lesser the child is prone to have Developmental Coordination Disorder with lesser motor proficiency. Lesser motor proficiency leads to difficulty in coordination which is also one of the cause for learning disability.

### III. RESULTS:

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<tr>
<th>AGewise RANGE</th>
<th>FREQUENCY</th>
<th>CUMULATIVE PERCENTAGE</th>
</tr>
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<tbody>
<tr>
<td>5-7</td>
<td>8</td>
<td>24.2</td>
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<tr>
<td>8-10</td>
<td>14</td>
<td>42.4</td>
</tr>
<tr>
<td>11-13</td>
<td>11</td>
<td>33.3</td>
</tr>
<tr>
<td>TOTAL</td>
<td>33</td>
<td>100</td>
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</tbody>
</table>

TABLE 1 shows that age wise distribution of 5 to 13 years, where they were classified into three age groups in 5-7- frequency of 8, 8-10- frequency of 14, 11-13 - frequency of 11, a total of 33 and the cumulative percentage of 100.

## TABLE 2: GENDER WISE FREQUENCY
GENDER FREQUENCY

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
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<tbody>
<tr>
<td>BOYS</td>
<td>17</td>
</tr>
<tr>
<td>GIRLS</td>
<td>16</td>
</tr>
<tr>
<td>TOTAL</td>
<td>33</td>
</tr>
</tbody>
</table>

TABLE 2: shows the gender frequency with 17 boys and 16 girls.

TABLE 3: shows the cross tabulation between battery composite score and DCD score, where the total frequency of 33 is differentiated into suspected DCD and non- suspect DCD according to the score of battery composite, the highest frequency was 121-130 scoring where the frequency of suspected DCD is about 10, then 151-160 scoring with 8 members. In this tabulation chi-square test is 2.934, p-value is about 0.56.
IV. DISCUSSION

The purpose of the study is to find out the prevalence rate of Developmental Coordination Disorder among Learning Disability. Since, there is a need in the identification of DCD among school going children especially learning disability.

Learning Disability is identified majorly on academic performance by the school teachers, parents and doctors who treat the child often regularly [11]. From the statistical analysis it is known that there is no correlation between the children with Developmental Coordination Disorder and Learning Disability.

The children were classified into mild, moderate and severe according to the DCD-Questionnaire, whereas mild and moderately scored children was taken in the study, but these children had scoring of 121-130, which is considered to be lesser motor proficiency.


Deborah et al (2002) “Developmental Coordination Disorder: Associated Problems in Attention, Learning and Psychosocial Adjustment” results that whatever the degree of severity may be increase of risk with learning, attention and social interaction [21].


Many researchers have showed that Developmental Coordination Disorder needs early intervention and if not the children will face many secondary complications such as attention deficit, social interaction with family, neighbourhood and society.

In this study, the children with learning disability are checked with motor proficiency where some children had difficulty in fine manual coordination such as paper cutting, coping shapes, and best of two trials were taken and the scoring was done accordingly. Balance was the next composite where the children scored less. So it has been proven that children with learning disability has balance and coordination problems.

Sonil S. Maharaj et al (2018) “Does a physiotherapy programme of gross motor training influence motor function and activities of daily living in children presenting with Developmental Coordination Disorder?” results that gross motor programme and small group interactions will be more beneficial for exercise intervention to improve
daily living activities. Certainly this study also shows that the fine and gross motor scoring are comparatively less with other subtests of Bruininks Oseretsky test [17].

Though there is no statistical significant difference between Learning Disability and Developmental Coordination Disorder, the causes may be due to less sample size, longer duration for motor proficiency tests but this study can be tried with larger sample size with intervention protocol especially designed for these children.

V. CONCLUSION:
The study concludes that the children with learning disability has to be identified in the early period. So, that early intervention protocol can be started, to avoid secondary complications in child life. The motor proficiency is very important in children from childhood to adult. As motor proficiency mainly deals with hand function, deals with mind and body coordination. Improvement in mind and body coordination increases in gross motor and fine motor control.

The DCD were classified into three types and the correlated with motor proficiency scoring with 121-130, where 10 children was suspected with DCD.

The limitation of the study was smaller sample size, due to the smaller sample size may be statistically no correlation between the motor proficiency and Developmental Coordination Disorder in children with Learning Disability. The duration for Bruininks Oseretsky test, takes longer duration so the kids needs to spend more time with each composite of the test.

The children with DCD has to be given proper exercise protocol to prevent motor proficiency deficiency. Every school children has to be identified with Learning Disability and checked with DCD and motor proficiency test, in case of lower score of motor proficiency then the exercise protocol can be started immediately to avoid secondary complications.

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CONFLICT OF INTEREST:
The author(s) declared no any conflict of interest with respect to research, authorship of this article.

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